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ABSTRACT

This course book provides a broad view of the theoretical aspects of instructional media. It is designed to acquaint students with the variety of instructional media that are available, from the simple to the more complex, and their uses in the educational system. The course's purpose is to develop the knowledge and skills which a curriculum developer in Africa requires to make reasonable and responsible media decisions. These decisions are based on nationwide educational objectives and take into account the resources available to meet those objectives. The course is divided into four units: (1) introduction to communication media and technology; (2) a systems approach to the selection and use of instructional media; (3) educational technology in Africa and other developing countries; and (4) mass media in education. A bibliography of references is included. (JD)

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African Curriculum Organisation (ACO)

Basic Training Course in Systematic Curriculum Development

Course Three:

Instructional Media I

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**ACO BASIC TRAINING COURSE IN SYSTEMATIC
CURRICULUM DEVELOPMENT**

General Editors: Sylvester N. Dioh, Kofi B. Quansah, Peter Sachsenmeier,

**COURSE THREE:
INSTRUCTIONAL MEDIA I**

NAIROBI, 1983

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TABLE OF CONTENTS

	Page
Introduction: Preamble	1
Correspondence Phase	3

UNIT ONE

Introduction to Communication Media and Technology:

Objectives	4
The Communication Process.....	4
The Media Of Communication.....	9
Barriers To Effective Communication.....	13
Definition Of Commonly Used Terms	14

UNIT TWO

A Systems Approach To The Selection And Use of Instructional Media:

Objectives	24
A Systems Approach	24
A Preview Of The Systems Approach In	
Instructional Situations	28
Factors To Consider In Media Selection For	
Instructional Purposes	47
Activity	48
Appropriateness	50
Availability	54

UNIT THREE

Educational Technology In Africa And Other Developing Countries:

Objectives	58
Historical Context Of Traditional Africa	
Media	60
How Has Imported Technology Influenced The	
Use Of Instructional Media In Africa	65
Production.....	72

UNIT FOUR

Mass Media In Education:

Objectives	75
The Role of Accompanying Material In	
Support of Broadcasts	81
The Development of Educational Radio and	
Television In Africa	88
Educational Radio and Television In The	
English-Speaking Countries Of Africa	90

References & Further Reading	97
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I N T R O D U C T I O N

PREAMBLE

In recognition of the important role played by various teaching aids, instructional media and related media strategies in curriculum planning and implementation, this course has been designed to provide the necessary skills and knowledge in the area of instructional media for curriculum developers.

The field of instructional media is very broad, ranging from simple aids which can be improvised from locally available resources to more sophisticated and sometimes costly electronic gadgets and systems. Priorities and preferences for the types of aids and media vary from locality to locality, nation to nation, depending on a variety of factors such as finance, skilled personnel to support production efforts, and availability of local low cost aids. Conceptual approaches also vary from place to place as reflected in the terminology used to define the field, such as educational technology, teaching aids, and audiovisual media.

The issue is complicated further by the fact that a large portion of the items and ideas which are usually included in the field of instructional media are aspects of imported technology originating from countries outside Africa. This is so especially when we consider the hardware of the media, and in some cases the software as well.

The approach which this course has taken will be to provide adequate knowledge and skills which a curriculum developer in Africa requires to make a reasonable and responsible media decision based on the needs of the educational objectives of his nation, and taking into account the resources that are available to meet those objectives.

To achieve this goal emphasis will not just centre on various aids and production skills in isolation but on developing a proper integral relationship between educational objectives and relevant support media systems. This approach should help in breaching the traditional gap which has existed between teaching aids or audiovisual technologists and professional curriculum planners. It should also provide a rationale for choosing between cheap, easily available aids and the more costly but necessary electronic media systems. Aspects of local culture will be included as various variables and the reality of the teaching/learning environment in most African countries are considered.

The course is divided into two phases: The correspondence phase and the residential phase. The correspondence phase, which is the content of this package, will deal with providing a broad view of the theoretical aspects of instructional media. This will be followed by the residential phase where opportunity will be given for practice of various production skills. While the second phase does not aim at converting the curriculum developer into a media technologist, it provides enough experiences to enable the planner to have a grasp of the types of skills and level of professional input necessary in planning for the appropriate media to be used properly in education.

What do we expect the students to achieve by the end of this course?

1. They should be acquainted with the variety of instructional media that are available from the simple to the more complex, and their utilization in the educational system.
2. They should understand the historical context of instructional media.

3. They should understand and be able to utilise the systems approach to plan for instructional media in curriculum development.
4. They should be acquainted with the nature and utilisation of mass media in education.
5. They should be able to assist in planning and developing an Education Resource Centre.

CORRESPONDENCE PHASE

This phase of the course introduces important theoretical concepts in the field of instructional media and also provides a general background to instructional media. To achieve this goal, four units have been developed as explained in this text.

What you should do:

Your duty as a student in this correspondence phase is to read carefully the objectives of each unit before studying the text. The purpose of the objectives is to guide you to understand what you are expected to achieve at the end of each unit. Where an activity is suggested, attempt to do the assignment. The significance of such activities is to help you to integrate the essential ideas in the text with your own work experience.

UNIT ONE

INTRODUCTION TO COMMUNICATION MEDIA AND TECHNOLOGY

OBJECTIVES

At the end of this unit, you should will be able to:-

- 1) define the process of the name the elements of a communication model;
- 2) explain the role of media in educational communication;
- 3) explain the historical context of instructional media;
- 4) define related terminology in the field of instructional media, such as educational technology, instructional technology, and teaching aids.

THE COMMUNICATION PROCESS

What comes to your mind when you hear the term communication? You probably think of a variety of activities which include talking to your friend, writing an article to a newspaper, listening to a radio broadcast, travelling from one part of the country to another, and so on. YOU ARE RIGHT. Any situation where messages or information is sent from a source to a receiver is a communication situation.

There are many types of situations. Some classification categories are: human and non-human communication. Human communication is concerned with transfer of messages between

people, while non-human communication refers to other types of communication, for instance, among bees, and chickens. In the same definition of human communication, we will include not only transfer or sharing of symbols between people, but also the means or media by which the messages are carried from the source to the receiver in various situations.

Let us define communication like this:-

COMMUNICATION IS THE PROCESS BY WHICH MESSAGES ARE SENT AND INFORMATION IS RECEIVED

Defining communication as a process introduces a new element which should also be defined. Process is any phenomenon which shows a continuous change in time. Berlo (1960, p.24) states that the concept of process ties events and relationships together in a dynamic, on-going, ever-changing and continuous chain. Labelling something as a process according to Berlo assumes that it is not static or at rest; rather it is moving, the ingredients within each process interacting with each other, each affecting the other. Every communication process has essential elements. Those elements are seen in such terms (ingredients) as source, encoder, message, channel, decoder, and receiver. Some of these terms are explained in the following excerpt from Berlo's communication model (pp. 30-32):

"When we talk about more complex communication situations, we often separate the source from the encoder. For example, we look at a sales manager as a source and his salesmen as encoders: people who produce messages for the consumer which translate the intentions or purposes of the manager.

For the present, we shall restrict our model to the minimum complexity. We have a communication source with a purpose and an encoder who translates or expresses this purpose in the form of a message. We are ready for a fourth ingredient, the channel.

We can look at channels in several ways. Communication theory presents at least three meanings for the word "channel." For the moment, it is enough to say that a channel is a medium, a carrier of messages. It is correct to say that messages can exist only in some channel; however, the choice of channels often is an important factor in the effectiveness of communication.

We have introduced a communication source, an encoder, a message, and a channel. If we stop here, no communication has taken place. For communication to occur, there must be somebody at the other end of the channel. If we have a purpose, encode a message, and put it into one channel or another, we have done only part of the job. When we talk, somebody must listen; when we write, somebody must read. The persons or persons at the other end can be called the communication receiver, the target of communication.

Communication sources and receivers must be similar systems. If they are not similar, communication cannot occur. We can go one step further and say that the source and the receiver may be (and often are) the same person; the source may communicate himself--he listens to what he says, he reads what he writes, he thinks. In psychological terms, the source intends to produce a stimulus. The receiver responds to that stimulus if communication occurs; if he does not respond, communication has not occurred.

We now have all the basic communication ingredients except one. Just as a source needs an encoder to translate his purposes into a message, to express purpose in a code, the receiver needs a decoder to retranslate, to decode the message and put it into a form that the receiver can use. We said that in person-to person communication the encoder would be the set of motor skills of the source. By the same token, we can look at the decoder as the set of sensory skills of the receiver. In one- or two-person communication situations, the decoder can be thought of as the senses.

These, then, are the ingredients that we will include in our discussion of a model of the communication process:

1. the communication source;
2. the encoder;
3. the message;
4. the channel;
5. the decoder;
6. the communication receiver.

In education we consider the Ministries of Education as the source of authority from which educational policies emerge. These policies and objectives coming from the source (Ministry) are hierarchically passed on to the teachers in schools. They then translate and interpret these objectives into realities during the learning process when they interact with the learners in order to obtain the set goals and objectives. In this case the teachers and instructors are the encoders."

In the above extract, Berlo has defined the elements of a communication situation. What you should note is that the actual communication situation has no clear cut divisions which can be observed in a static form. We therefore refer to communication as a process whereby the source influences the receiver who, in turn, influences the source through simultaneous interaction. The concept of process is important to understanding communication because in the day to day usage of the concept of communication there is always the tendency to view the flow of messages from the position of the source without considering other interactive factors which may affect the way the messages are received and perceived. Communication is, therefore, a continuous two-way process whereby the receiver as well as the sender obtain feedback from each other, and hence, it is said communication, whether intended or unintended, has taken place. Feedback is an important component of any communication process because it is the only way in which one can determine to what extent the transmitted or coded message has been received.

As educators our view of the communication process concerns the flow of intentional messages with specific goals. The message are coded and transmitted so that they may reach the student receiver.

Now that you have completed reading about the process of communication try and answer the following questions. If any item in the questions is not clear, read the text again.

Follow-up activities:

A. Imagine a teaching/learning situation. What parts of that situation correspond with the following parts of the communication process as defined by Berlo:

1. the communication source
2. the encoder
3. the message
4. the channel
5. the decoder
6. the communication receiver

B. Select a teaching-learning situation familiar to you and describe its communication behaviour and the interaction of the communication ingredients from the point of view of Berlo's communication model.

THE MEDIA OF COMMUNICATION

The Media of Communication are the means by which we receive information and send messages. In the above article by Berlo the media were referred to as the channels. The human body utilises its five senses to receive information, that is, the senses of smelling, feeling, seeing, touching and hearing. These are the mere entry points at which information, enters the human body. The important aspect of communication is how the message is made accessible to any of the five senses. The media perform the task of conveying the message from the source to its receiver in its various forms. The media of communication therefore include printed word symbols and structures, pictures, drums, radios, televisions, videos, projectors, three dimensional figures, and the general environment with its physical phenomena. (Unit III will go into details of these media types).

The media of communication take many forms depending on the types of messages being sent. In teaching/learning situations the variety of available media help the teacher to structure instructional messages (content) so that the learner may receive the intended message and be able to respond as expected. A convenient way of explaining the role of media in communication in teaching/learning situations is by considering the experiences which are necessary for learning to occur. Here knowledge from the psychology of learning can be useful. Since communication involves ability to interpret and share meanings, factors like culture, social background, beliefs and others, play an important role in determining what types of media are necessary for information transfer.

Symbols, visuals and Direct Experience:

Research shows that there is a difference in how much we learn from various media. The content of this section on symbols, visuals and direct experience is adapted from the Visual Communication Handbook by D. J. Saunders.

- i. A spoken word is a symbol for an object conveying an idea. The meaning of words vary with the experiences and culture of the communicator.

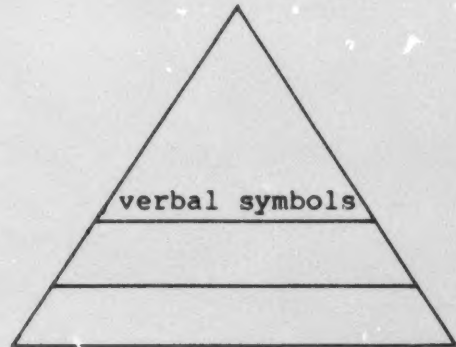


Fig 1
Using one Media only

- ii. Although visuals are not a universal language, they are closer to the real world. Minds remember things in forms of pictures. Therefore ideas are made more meaningful by the use of visual symbols.

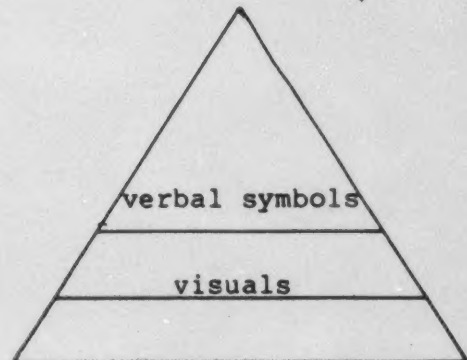


Fig II
Using more than one Media

- iii. Things which we learn by doing are more easily remembered than what we only hear about. Through direct experience, we use all our senses to receive messages.

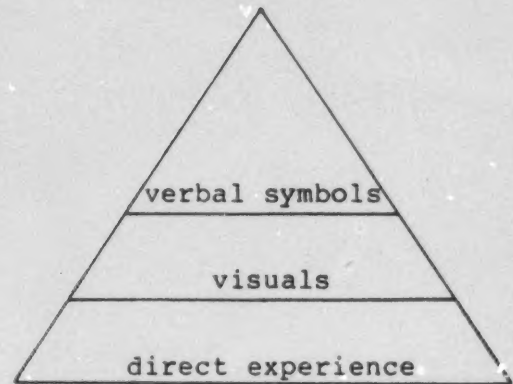


Fig III
Using three or more Media

The relationship between hearing, seeing and doing is important in communication. This relationship as illustrated in the above figure can be restated with research data as follows:-

You remember 10% of what you hear.	If I hear, I forget.
You remember 50% of what you hear. and see.	If I see, I remember.
You remember 90% of what you hear, and see and do.	If I do, I know.

Figs. I, II, and III, and the accompanying statistics illustrate clearly the relationship between effective communication and the kind and number of media used. These examples also give support to the conclusion that the more personally involved through practical participation the sender and the receiver are the more effective is the communication media. This is why when you only hear a message or only see something you remember only 10% of the message. But when the communication comes to you through three or more sensory organs, you remember 90%.

The learning process involves the transmission of desired information from a source to a receiver through a medium so that the desired or anticipated outcomes may be achieved. It also involves a corresponding reaction from the receiver to the source (teacher) through a feedback system. All this goes through a communication media, the effectiveness of which depends, on such factors as the environment and the individual capabilities of the learner.

In a teaching-learning situation we are dealing with individual learners. According to Dunn (1972, pp. 49-54), "each child learns in a manner which is uniquely his own through perceptual strengths and weaknesses that either fortify or discourage the acquisition of knowledge, skills and attitudes; and with a learning style that tends to dominate his every effort to achieve." Every effort to achieve calls for the use of as wide a variety of media as possible. Such media should be so selected as to require the use of a wide range of the senses. Therefore, let the communication media used in the learning process involve visual symbols. Write on the chalk-board, show the students flipcards, use filmstrips, radio, video, and so on. Let them observe and see things in the environment. All these are communication processes.

Follow-up activity:

Think of a classroom situation in which a teacher communicates with his pupils.

- a) What types of media are used?
- b) To what extent is it true that, "if I hear, I forget; if I see, I remember; If I do, I know?"

BARRIERS TO EFFECTIVE COMMUNICATION

The purpose of communication is to be effective in achieving a predetermined goal. When we have a message which we expect to deliver to people so that some action may be taken, we structure the message through planning, select appropriate media, and expect that the desired action will be taken. Since, as has been explained already, communication is a process, barriers to effective communication may arise from various sources. A communication barrier is what hinders the receiver from getting a message. Here are some of the barriers:-

Age: People of different age levels have varied expectations consistent with their age levels. What appears reasonable to a teenager may seem unreasonable to an adult.

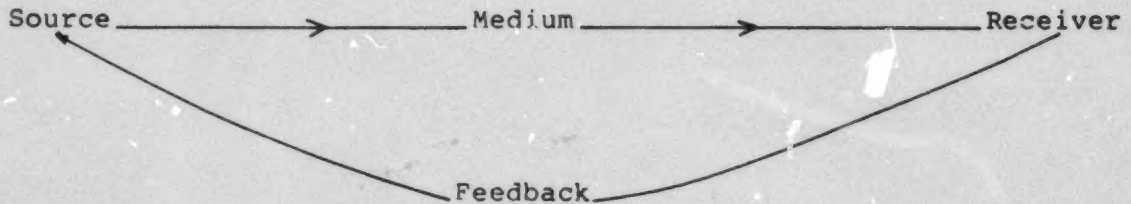
Language: Type of language and vocabulary level affect the clear communication of a message.

Background: The cultural and social background of the receivers or senders affect the way they structure and interpret messages. Research shows that ability to read visual symbols has a cultural or background bias.

Can you think of other examples?

To be able to overcome barriers to effective communication, we need an inbuilt feedback system so that cases of communication breakdown may be identified and corrected.

A simple model of a feedback system:



Similarly, in this system, the feedback is more effective where several communication media which utilize several sensory organs, are used and where they are accompanied by the active participation of the receiver in the process.

The information received from the receiver after a message has been sent is what we call feedback. This helps us to know to what extent the message has been received or understood. We can then, on the basis of this feedback, either alter the next message, change the media or repeat the message, whichever is necessary. Feedback is what provides the two-way process of communication.

As you read further in the forthcoming units in this series, you will be introduced to various terminologies and concepts. The next section examines some of these unfamiliar terms and concepts.

DEFINITION OF COMMONLY USED TERMS

The terminology defined here is not a complete list of all possible terms and concepts in instructional media. The selected terms here, however, are important in developing a working perspective in the area, especially since instructional media or

educational media in most African countries have often been imported from elsewhere as finished products. To a curriculum planner it is important to have a broad view of the key concepts so that appropriate alternatives can be suggested where necessary.

A historical perspective of instructional media, particularly educational technology, helps in identifying some of the circumstances and assumptions which were influential in the development of the concepts and their various usage patterns. This helps us to understand the terms.

1. What are Instructional Media?

We have just learned that the media of communication are the means by which messages are conveyed from sources to receivers. When we add the term instruction to the media of communication, the implication is that Instructional Media are the means by which instructional messages are transmitted from sources to receivers. Instruction is a planned sequence of activities through which a learner interacts with relevant resources (including the teacher) in order to acquire a predetermined behavioural outcome.

Instructional media are the things which facilitate this process. There are several other terms, like "audio-visual media," "and communication media," which are used to define the field we call instructional media. Other related concepts include teaching "aids" and "media". The following extract from a book by Bretz (1971) will help you distinguish between various terminologies.

Communication Media Versus Communication Aids

The use of a communication medium in instruction makes it unnecessary for an instructor to actually be present when and where his instructional presentation is received. This separation is possible because the instructional program contains all the necessary parts of the message: audio and/or visual stimuli and exposition of some kind to give them the requisite significance. The exposition is nearly always verbal--either spoken or written. The medium carrying this complete message is being used as a communication medium. Considerable confusion in thinking has resulted from the practice of applying the general term media to both complete communication media such as films and video tapes, and to aids such as charts and slides that a lecturer might use to illustrate his remarks. These instructional aids do not carry the entire instructional load but serve only to support a classroom teacher's face-to-face presentation. Both communication aids and communication media have traditionally been classed as "audio-visual media," and in education as "instructional media." Whatever meaning we accept for the general term "media," it is important that we make a clear distinction between media which are only communication aids and media which are complete communications systems.

As a general rule, the communication medium contains verbal exposition, whereas the communication aid does not. A device that does not contain narration, commentary, dialogue, or captions in its software, such as a slide or overhead transparency projector, is generally useful only as an aid to instruction; verbal exposition by a live classroom teacher must accompany its presentation. On the other hand, if the device does contain its own exposition, it cannot readily be used as an instructional aid; the sound must be turned off or the printed captions edited out if the words of the program are not to interfere with what the classroom teacher is trying to say. Thus, for most purposes the two categories, communication aid and communication medium, are mutually exclusive.

Three situations should be noted which may look like exceptions, but which actually do not affect the rule: (1) A self-contained film, a recorded speech, or a piece of music may be presented not as instruction but as a subject for study in and of itself. This would constitute neither an instructional aid nor an

instructional medium. (2) A short segment of sound film, a filmstrip, or another instructional device may be integrated into a classroom lesson presentation. This is a clear case of the use of a communication medium, however brief the use may be. When a film is on the screen, for example, the teacher will, in effect, turn the students over to the medium and expect them to give it their full attention. The teacher may assist or supplement it by occasional comments or provocative questions, but the medium is doing the teaching.

(3) A classroom teacher may interpose comments during the running of a film, relate it to the recent experience of the class, or name individuals to respond to questions put by the film. In this case the teacher is assisting the film, not the other way around.

The main reason for this insistence upon a clear distinction between instructional aids and communication media is the decided difference between them in their importance to education. The difference is far more significant than a distinction between incompleteness and completeness. The instructional aid generally plays a minor role in a limited-output system, in which an instructor making a lesson presentation reaches no more learners than his classroom can hold. Except for becoming more widely and effectively used, instructional aids in the classroom will probably never play a more important role than they do today. Certainly they are not likely to change the nature of instruction.

Communication media, on the other hand, can be put at the core of a system, the output of which could be staggering. Instructional aids are limited to use during face to face interaction between the teacher and the learner. They are not a self-contained instructional package and cannot on their own enhance learning. Some authorities have described them as catalysts to learning. They facilitate learning and make it more meaningful.

2. Educational Technology

Educational technology is a term that is used regularly in education and yet users understand it differently. To many people, educational technology is the use of sophisticated

equipment in teaching-learning situation. This is a misleading view. "Technology" has been defined in various ways by various users of the term. To some people it is a scientific study of a subject based on certain principles and resulting in the production of concrete objects. But technology does not always reflect science. The history of technology reveals that people have invented methods and used them for solving problems without necessarily having prior knowledge of the scientific significance of their inventions. Technology becomes relevant to communication in learning when certain man-made ideas and tools from science and technology are used to facilitate the transfer of information in the process of learning from the teacher to the learner and vice-versa. For instance, the tape-recorder device can be used to record experiences which a learner can relate to other experiences to arrive at conclusions. The printed material, films, photography video and television which are all technological devices can be used as communication tools in the teaching-learning process. Those scientific and technological devices used in the educational process are referred to as educational technology. This definition limits educational technology to instructional aids and resources.

But there is more educational technology than meets the eye. The term is not a synonym for instructional media. Educational Technology is emerging as an interdisciplinary conglomerate concerned with virtually all aspects of education, from a short segment of instruction to the national system within which it functions. Mitchell, (1978, p. 109) defines Educational Technology as being

"concerned with everything involved in education from instructional materials through all the institution-related problems of organisation of people and resources, to community development and even town planning. At the other extreme we find many seemingly unrelated notions which pick out one aspect of this holistic view, e.g. that educational technology refers to instructional apparatus or that the educational technologist is simply a workbook writer. The gap between these interpretations is crowded with different uses of the term educational technology. Analysis of the concept is bound to be fraught with difficulties. But is no less essential to clarify it. To what extent may the term educational technology refer to a genuine field of enquiry and to what extent is it simply pretentious or confusing? Is there any hope of discovering a single meaning or will we end up with several? And is instructional technology the same concept?"

This view of Mitchell is also subject to great debate. Another educationist (Gillett, 1973, p.131) has described educational technology as a systematic way of designing, applying and evaluating the total process of teaching and learning. The more modern view is that educational technology is the whole range of instrumentation techniques for all media, old, new or those still over the horizons, whether mechanical or electronic, manual or automatic (Withworth, 1971, p. 16). From an analysis of these and many other views on the meaning and scope of educational technology, it seems to us that the view of Silber (1972, p. 36) seems to be the most acceptable. In his view,

"Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organisation, and utilisation of a full range of learning resources, and through the management of these resources. It includes, but is not limited to the development of instructional systems, the identification of existing resources, the delivery of resources to learners and the management of these processes and the people who perform them".

When educational technology is seen from Silber's point of view, then it encompasses all components of the learning process. Consequently, when we talk about educational technology, we are not only concerned with the devices, whether traditional African ones like the zylophone and the drum, or the modern imported electronic ones, as are used in the learning process. We are also concerned with educational technology in so far as it influences the structure of the learning process. The level and application of educational technology in education also influences the determination and formulation of educational objectives, the instructional methods and techniques adopted, the other resources applied to the learning process and the evaluation of curriculum programmes. Within this context educational technology is wrapped within a very broad definition. Given this broad perspective of educational technology, most users specify the areas of emphasis depending upon the nature of the problem they are dealing with.

Educational technology has been seen by those concerned with it from two points of view. They have seen it from a behavioral view point and from a physical sciences stand point. These two views are, in terms of the functions of educational technology, inter-related. To many, educational technology is concerned with the application of technological expertise in producing machines (often called hardware) such as overhead projectors or 16 mm projectors, and other less durable products such as electronic cassettes (software) to be used in instructional situations.

The emphasis on the optimal allocation of human, financial and material resources to produce anticipated educational results, means that educational technology is concerned with

educational innovations, and facilitation of the learning process. The notion of choice is implied in the use of various aspects of educational technology in instruction. The choice made of the kind of educational technology to be used in each instructional situation is determined by the appropriateness of that media in facilitating communication and interaction between learner and teacher so that learning can take place. This leads us to the notion of appropriate technologies in education.

Follow up activity:

What is the rationale for including African traditional instruments and practices in instructional situations as educational technology?

3. Appropriate Technologies in Education:

We have discussed the meaning and scope of educational technology in the previous section. In this section our focus is on the examination of the various aspects of appropriate technology in education. Here the question that comes to mind is, when does educational technology become appropriate? Relativity is implied in the term appropriate. Does the particular technology being used in an educational situation provide optimum learning conditions? The degree of utility of any particular type of educational technology in any given learning situation to a very large measure determines the appropriateness or non-appropriateness of any technological device in an educational situation. This utility is the function of:

- (a) the relationship between the attributes of the educational technology and the needs of stated learning objectives;
- (b) the accessibility of the particular educational technology to the learners at the appropriate time in the learning sequence;
- (c) the physical and chemical characteristics of the device such as durability, or ease of use by the learners;
- (d) the cost-effectiveness of the device.

To put this in another way, the appropriateness of an educational technology depends on whether it has those essential characteristics which influence and contribute to the clarity and impact of the teaching-learning process. "Determining this involves examination of the technology's capabilities in terms of sensory experience, such as audio, visual, audio-visual, for stimulus and/or response, plus strategy requirements for practice, transfer and feedback during the teaching-learning process" (Mutebi, 1983, p.8).

In applying technology to educational situations, particularly in the learning process, it should always be remembered that a given technological media may be appropriate in one particular instructional situation and be most inappropriate or unsuitable in another function in the same learning sequence. In view of this experience, it is usually advisable to consider a number of alternative educational technologies for a given sequence of an instructional situation. In this case each of the varieties of

technologies used should be assigned to the part of the instructional sequence where it will be most suitable in aiding or facilitating effective learning and feedback.

After the above considerations the best alternative approach would then be the appropriate educational technology.

The concept "appropriate technology" has been created as a response to the need for technology which has to a large extent been imported from industrialized nations, to be modified and simplified in order to suit the needs of the less industrialized nations. What is considered appropriate in every situation will therefore vary with the available resources, facilities and the nature of the problem.

In the forth coming units, you will learn about some of the specific efforts in applying appropriate educational technology as you learn about other aspects of this media course.

U N I T T W O

A SYSTEMS APPROACH TO THE SELECTION AND USE OF INSTRUCTIONAL MEDIA

OBJECTIVES:

At the end of this Unit, you should be able to:

1. define the concept of a systems approach;
2. relate the concept to planning for selection, use or production of various instructional media appropriate to stated educational objectives;
3. list and explain the different types of instructional media;
4. relate various media to different teaching and learning situations.

A SYSTEMS APPROACH

A systems approach is a scientific method by which units, parts or elements are viewed as existing in interaction and are interrelated in some arrangement to fulfil various identifiable purposes. This approach involves applying the principles of general systems theory to problem solving processes. The method is derived from the General Systems Theory, which has been extensively used in engineering and the management of industrial processes. It has also been applied to the analysis of world economic systems, understanding the problems of mental disorders,

political systems, biological processes and numerous other areas where different units interact and/or affect each other in the accomplishment of different purposes. The approach has been found useful in the development of conceptual frameworks for understanding interrelationships between various factors in problem situations involving many varied elements and processes.

In education, where there are many such factors which affect the processess of learning, systems thinking becomes relevant as a method by which a meaningful interrelationship can be established. Through this approach, research studies which have been independently conducted in human learning, communication theory, sociology, and other areas, can all be integrated, leading to effective utilization of available resources to solve the defined problem.

In the field of instructional media and curriculum planning, the systems point of view is very useful because its essential concepts help in selecting or creating items and programmes so they relevant to the many varied objectives and student characteristics, as well as changing resources and needs of educational systems.

The systems point of view is made up of certain characteristics which have been found to be common to most living systems. Some of these characteristics are explained below. It is important to note here that the approach is not a fixed programme or sequence of events. The order which is derived in solving a particular problem depends on the type of problem, environmental factors such as resources and constraints surrounding the problem area, and the type of output expected from the system. Therefore, the extent to which the point of view can be useful to the plan depends on the ability of the designer to conceptualize the

problem area and plan an arrangement which will solve the problem or create an innovation, taking into account all the possible variables and resources in the system environment.

In the area of instructional media and education in general, the following characteristics of the system are useful:

1. Systems are goal oriented:

A systems approach starts by making sure that the product or outcome of instruction is stated clearly so that one can measure to what extent the goal has been achieved.

Behavioural objectives are a derivative of this point of view. As far as the media is concerned, a systems approach starts by asking to know the goal to be achieved before prescribing the possible media alternatives, rather than taking the media as given and asking how it should be used to achieve already fixed goals.

2. Systems operate in an environment

This characteristic of the systems point of view leads to the analysis of the environment, considering its available resources and limitations with respect to the stated goals.

In educational systems, availability of local resources and media, manpower, finance and other related factors are taken into account. As far as the environment is concerned, it is also observed under this view that the environment is constantly changing, and so are the beneficiaries of the system. The planners must also plan to obtain feedback on a continuous basis to be able to change and provide service to the new needs or withdraw those services which are no longer wanted.

3. Equifinality is a concept which states that starting from any point in the planned sequence of events towards a stated goal, one can start from any point in the sequence and still reach that same goal. This concept in education has led to various approaches towards individualization of instruction. It has also led to developing alternative approaches to any given situation.
4. Entropy is another concept which is usually considered as a disorganization characteristic of the systems approach. Entropy is the degree of disorganization in a system. Systems which are open take in energy or information. When they do so, they are able to grow in new directions or increase their operations as the environment demands. If they fail to do so, then, according to the second law of thermodynamics from which the concept is derived, the systems will die or collapse. This concept is used in education and especially in instructional media systems, to stress the fact that feedback and input are essential to the survival of the system.

There are other characteristics, but what is identified here is what applies to the educational environment in the area of instructional media.

Now read the following text entitled "A Preview of the Systems Approach in Instructional Situations" taken from A Systems Approach to Teaching and Learning Procedures: a Guide for Educators in Developing Countries. UNESCO, Paris. 1975.

A PREVIEW OF THE SYSTEMS APPROACH IN
INSTRUCTIONAL SITUATIONS

Applications at the micro-level

This book is about a methodology. It has already been suggested in the introduction that the method has been used effectively in the planning and implementation of large-scale projects in fields other than education. What is not so well known is that the same principles may be employed to improve existing teaching-learning situations in the classroom or to introduce new methods, materials and equipment in a way which causes the least disturbance to the people in the educational situation, be it in the formal or non-formal area.

Introduction

Acquiring expertise in systems analysis and design requires the expenditure of time and effort. The application of the principles to teaching-learning situations requires an even greater investment of resources at the micro-level.

Let us therefore start this excursion into systems analysis (part of the systems approach) by considering one fundamental aspect, that of input-output comparison.

It has already been stated that time and some energy will have to be invested to learn how to employ the systems approach (that is, how systems are analysed, designed, developed and installed). If we now consider what benefits may flow from the use of the systems approach, an assessment can be made of whether the resources required (input) are worth the benefits to be derived from the newly acquired attitudes, knowledge and skills (the output or product).

The benefits that may flow from the use of the systems approach can only be assessed by the reader after a consideration of the attitude, knowledge and skills that he may gain. This book, then, sets out to present ways of:

What the reader may gain

Identifying the characteristics of what the student can do after a learning experience (i.e. is he able to repeat from memory or can he use the knowlege?).

Assessing whether what the student can do after a learning experience contributes relevantly to later learning activities and to the needs of society (effectiveness and benefits).

Estimating the value of the resources (time and energy) put into the teaching-learning situation in terms of money (costs).

Evaluating the advantages and disadvantages of feasible courses of action supplementing the information by cost-effective and cost-benefit analysis.

Identifying the weaknesses in a teaching-learning situation if the end product (what the students can do) is unsatisfactory.

Deciding what end product is required, what changes are required to achieve it, what the consequences might be if those changes were made and how the changes can be brought about in the most economical way.

Identifying and emphasizing in a teaching-learning situation the procedures that provide information to the student and the teacher to help them improve their performances.

Designing and implementing changes in formal and non-formal; teaching-learning situations.

If the reader believes that the acquisition of these abilities will enable him to improve the system of which he is a part to a degree which he considers is commensurate with the resources input, then the effort put into the production of this book will have been worth while.

The components of a system

What then are the components of a system? The biological system of a cell was discussed in the introduction but the components of all systems are similar. In an instructional system there is a product (for example, ability to read) which may be required as an input to some other system (for example one designed for private study). The product results from the interaction that takes place between the instructor, the student and the media via the method used. This interaction is used to convey the content.

The product

The time and energy of the instructor in preparing activities for himself and the student, the time and energy expended by the student in learning, the material and equipment (media) which may have been employed and the accommodation are input resources. Resources which have to be paid for.

Activities

People, regulations traditional practices, national examinations and lack of or inadequate material (equipment) which prevent a course of action or modify it are called constraints. In order to direct the activities of the students and instructor towards the desired product, there must be guidance along appropriate routes. All the activities concerned with learning will take place in a human relations atmosphere' which we will term an ethos.

Resources

Constraints

Guidance

Ethos

Such an ethos may be restrictive and oppressive or open and democratic. The quality of the product may be much affected by the ethos in which it is produced. The type of motivation employed to maintain the interest of the student and the quality of the product is also influenced by the ethos. To evaluate the effectiveness of the product and its benefit to other systems, data are collected about the requirements (expectations) of these systems and about the achieved product. A comparison between these data will provide information on the effectiveness of the system. If the comparison is unsatisfactory, interpretation of the compared data will give pointers concerning the system components that will need to be modified to improve the product. The data feedback by the collecting procedure, the comparison process, interpretation and the decisions made on the changes required are called formative evaluation because the form of components are changed in an attempt to improve the product. Summative evaluation, on the other hand, is only concerned with collecting data on a product, comparing the quality of the product with a predetermined standard and making a pronouncement on the degree of success achieved. (National examinations are summative evaluation instruments.) Evaluation is also concerned with assessing the costs of a particular course of action and relating them to the effectiveness of the product and the benefits derived from the use thereof.

Motivation

Evaluation

Feedback

The concepts discussed above will be applied to a teaching-learning situation in a primary-school class. The example below is not intended as a recommendation or a criticism. It is merely used as an illustration of the systems approach at the micro-level.

A teacher had a class of fifty students and blackboard. She was teaching the students to read. The method she

The existing
situation

employed used five sentences (already written on the blackboard). She read the first sentence aloud, after which the students 'read' it as a group. The teacher continued in this way until the five sentences had been read by her and repeated by the students. She then told the class to start reading again from the first sentence. The class faltered (hesitated or stopped) and she reread the sentence for them. This procedure was followed until the students as a group could read all the sentences without faltering. The time taken to reach this stage was one hour.

We will now identify the various components in order to relate them to those of the system outlined above.

The Components

Product: From the data given above, it would appear that the reading aloud of five specific sentences is all that is required. Whether the students could read aloud five restructured sentences using the same words, or react to the sentences in some way to show their understanding is not ensured by this method but it may contribute to those other products.

Activities: The media are the teacher's voice, facial expressions and body movement and the blackboard. The students listen, look at the blackboard; (and the teacher) and repeat sentences aloud.

Resources: The teacher spent time and energy on the preparation of the sentences and chalk in writing them on the blackboard. Teacher and student time was expended during the learning period. The cost of such time, energy and material (chalk) may be termed recurrent expenditure because the input of this time, energy and materials is continuous and essential to

maintain the teaching-learning procedure. Resources such as the accommodation, desks and blackboard are used for many if not all the activities and need not be supplied anew except on a long-term basis. The cost of such resources is termed capital and is spread throughout the activities in the form of a rent.

Guidance: In the teacher-controlled situation set out above, the students are guided by the teacher's voice alone, but as will be seen later, in more 'open' and individual teaching-learning systems, more sophisticated procedures for outlining and guidance will be required.

Feedback and evaluation: The teacher, after having read the first sentence (presentation phase), told the students to repeat it (guidance); the students' voices provided feedback to the teacher. The teacher then assessed the quality of the response in terms of whether the students as a group faltered. If the group did not falter, she then read the next sentence; if they did, she read the sentence again, thus providing feedback to the students to enable them to improve their performance when asked to say the sentence again. This is the formative phase based on an evaluation of the part-product. This phase may also be called the rehearsive phase, but it is essential for formative evaluation to be present (provided by the teacher or some other agent, for example an answer book) to ensure that the product is of the desired kind and quality. The rehearsive stage continued until the group could read all the sentences without help (prompting) in a fixed order and without faltering. At this point, the teacher stopped the procedure. Her summative standard had been satisfactorily reached.

Ethos: In this class, there was a fairly friendly teacher-student relationship, but all decisions were

taken and all directions were given by the teacher. The reasonably friendly atmosphere helped to motivate the students as did the success at being able to 'read' the sentences-provided the word order was not changed.

After using this system for a short while, the teacher found that the time to reach her expectations was increasing. That is, the standard of a faultless performance by the group was taking longer to be achieved. The teacher has observed that some of the students were bored and not really trying. The students no longer appeared to be motivated as well as they were at the beginning. She decided to ask her students why this was (feedback). Two main reasons emerged. One was concerned with boredom due to the sameness of the procedure (which had been used almost exclusively by a previous teacher). The other, more serious, reason hinged upon a poster that the teacher had put up. The students had expected to be able to read it but were unable to do so. The benefits that had been expected as a consequence of all the effort had not appeared. (The cost in terms of time and effort in learning, when compared with the benefits, was too great. It is not suggested that the students would carry out such a comparison consciously but we all make such comparisons, sometimes on very incomplete data.)

Signs of
dissatisfaction

What should the teacher do to improve this situation? She had learned three things that would help. (a) The introduction of a new element (the poster) into a system may have unforeseen consequences. (b) The benefits that derive from the application of the learned product must be enjoyed quickly and be valued highly enough by the students to make them want to continue. (c) Different methods of achieving a product need to be used to maintain the interest of the students.

General aims

The general aim therefore would be to recreate interest by changing the method and to allow the students to benefit from the learning activity in a way which is meaningful to them.

The students would once again become interested and seek out opportunities to read.

Signs of success

The teacher decided to change her method and introduce a game element. She obtained a card large enough to cover all the sentences, with a slot just wide and long enough to reveal one sentence at a time. The card was moved to reveal one sentence which she read aloud to the students. She then moved the card to another sentence and read that. The teacher then returned to the first sentence. If the students couldn't read it, the teacher reread it and scored a point. If the students succeed, then the class scored a point.

A possible solution

It is likely that student interest will be revived by this method and it does have a slightly greater degree of flexibility in that the order of learning the sentences has been randomized. The method does not however ensure immediate benefits in terms of reading and understanding for a purpose.

Consequences

The characteristic of the product could be changed to try to ensure that the students enjoy the benefits as soon as possible. In the two instances given above, the product (the students as a group reading the five sentences aloud without faltering) was similar. Suppose we change it to: 'given a sheet of paper on which a series of line drawings (eight, for instance) are displayed, each student will be able to mark the five drawings which match the five sentences randomly revealed, as in the first possible solution. If these sentences form part of specially prepared posters which ask questions or give simple

Another solution

instructions, then when the learning process has been completed, the posters can be put up for the students to read and act on. Eventually the students could produce their own posters of short funny stories or riddles, illustrated if necessary to aid comprehension.

It is likely that the solution given above will achieve the ends of recreating interest and provide immediate benefits in the form of posters to be read and discussed with other students. The diversion of energy from the concentration on reading aloud to reading for meaning will probably cause a drop in the standard of reading aloud. If this skill is a requirement of an examination (a constraint), then this drop in standard will not be popular with anyone and the new method will have to be dropped or amended to a form which produces a product more in line with expectations.

Consequences

To sum up, the teacher had the problem of her expectations not being met in regard to the time that the students took to reach her predetermined standard (the information on learning fed back to her was evaluated by comparison with the standard). The result of the evaluation led her to try to discover the reasons for the difference. (She asked for information from the students - more feedback, this time concerned with method.) Observation of the performance of her students would feedback information on whether the change was succeeding.

A summary

One of the inputs to her instructional system was the legacy of the previous teacher's over-use of a similar method to the one she used originally. Thus an unsatisfactory performance may be traced to some influence outside the system of interest. At the output end of the system, there may be external constraints such as an examination (unlikely to be

changeable by a teacher) or the head teacher's end-of-term test (which is capable of being changed), which determine the form of the students' product. In addition, educational research can suggest a course of action for the teacher which may clash with traditional customs.

Thus it can be seen that no part of a system is independent of any other part or indeed of any other system which receives its output or supplies an input. It can happen, however, that redundant components appear if the systems approach is not used when changing or innovating components. Here again, analysis of an existing system will reveal these redundancies. These aspects and others will be briefly discussed in a few examples which follow.

Aspects of instructional systems

When a student is studying to be a teacher, he probably learns about 'new' methods of teaching. After qualifying, he may want to put some of these new ideas into practice. He often finds after a little while that he is teaching in the ways adopted by his more senior colleagues. He is not copying them. He has not given up his ideals. Somehow he finds himself having to teach in a different way. He is adjusting to the system. Only rarely does the system adjust to him. The school examinations exert an influence on him-his students must pass. The experience and expectations of students and parents play a part - if he does not give tests and marks but simply individual progress checks, students and parents worry about the absence of grading. He finds himself in a system which has purposes, expectations and standards, established relationships and ways of working which

Example 1

are very difficult to change. If he tries to work in a different way, there are repercussions from parts of the system to overcome the disturbance.

In a developing country, a new science curriculum was to be introduced. Because there was an insufficient number of science teachers, the curriculum board decided to use programmed learning. The method was built around student texts for individual, self-paced learning. Every few sentences, there was an opportunity for the student to make an active response and to get an immediate check on the correctness of the response (feedback to the learner). An example of one of the items follows:

Example 2

Molecules are made up of atoms. For example, hydrogen molecules are made up of hydrogen atoms and oxygen molecules are made up of ox-----	(oxygen atoms)
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The answer in the right hand box is covered by a mask. After the student has made his response to the incomplete word and the line, he pulls the mask down to reveal the check answer, 'oxygen atoms'. Other items of a similar form follow until a test is reached.

All should have worked smoothly, but the teachers were unused to students taking different times to be taught. Some finished in twenty minutes, others in forty. The teachers were also unaccustomed to the inactive role they were expected to undertake. Moreover, the students object that they were forced to cheat! (The correct answer was given every time.) Nobody was happy with this situation. The curriculum board members, who were experienced members of the department, had not anticipated this reaction.

In another school, faced with a similar problem, the teachers were given a copy of the text which they wrote on a roller black-board. The teachers and students read the items and chorused the answers which the teacher confirmed. The students learned, none felt unhappy about cheating, the teacher exercised his accustomed role and the students' activities were co-ordinated so that they finished together in the usual way. Thus the factors in the teaching-learning situation which interfered with the new method were accommodated without destroying the effectiveness of its purpose (teaching a curriculum which was new to students and teachers alike).

An area school inspector (school district supervisor), introduced new teaching methods into a small number of schools as a trial. He was attempting to develop a 'discovery' method of teaching science. Of course, the teachers who co-operated on the new style of lessons became familiar with their new roles and the conduct of the new, teaching approach. The method was enthusiastically received and actively practised.

Example 3

After several months however, teachers in the different schools returned to their former teaching methods. They were conscientious, skilled and responsible people. They became concerned that the new form of learning would result in the students acquiring a different kind of knowledge, a kind of understanding different from that required by the examination to be taken by the students. The local inspector was unable to change the examination so his attempts at reform were unsuccessful.

Example 4

A system is never isolated. Its outputs become the inputs of other systems and it receives inputs from other systems. This interrelation-ship is as responsive to external changes as changes made in the components of the system itself. Thus from

outside, a change in the rules of a sport (for instance, the offside rule in soccer) will call for changes in the training programme of a team. Equally, improvements in skills in the team may require a re-organization of the team. It is easy to see how the purpose of the system may give rise to ambiguity and even conflict. A school may include team games for many reasons -for motivating physical exercise, for developing muscular co-ordination, social interaction and co-operation and to instil team spirit and a school feeling of 'we'-ness (unity). Individuals connected with the playing and support of the team may begin to give different weight to the enjoyment of exercise and to winning. They may no longer be willing to accept defeat in a spirit of sportsmanship. They may concentrate their determination and energy to not losing.

This tendency for the purposes of a system to change is reinforced by the fact that a successful team gets more attention from other systems. The attitudes associated with winning begin to invade the school environment and begin to clash with the school's general purpose. This disharmony will act as feedback to the head teacher who will try to retrieve the position before a serious conflict of aims results. A major aim of the systems approach is to find ways of rechannelling such destructive energy into more productive work for the good of the system.

In teaching practical chemistry, a second-year class teacher had considerable difficulty over the number of chemical balances which were regularly out of action. Students would break the delicate knife edges. In spite of regular warnings and specific instructions, this damage continued. Attempts to change the students having failed; what could systems analysis do to help?

Example 5

Let us start with the question 'Will the cost of solving the problem be greater than the cost of repair?' (Some large firms no longer insure portable equipment against theft because the cost of the insurance is greater than the value of the articles stolen.) Other questions might be, 'Is the amount of damage greater than is normally expected?' or 'Can alternative solutions be found that have different "costs"? For example, more intensive training not only uses up the teacher's time, it also builds up an attitude of resistance in the students. Installing devices to ensure that the balances will not be misused can be extremely expensive and may stimulate some students to try to beat the system (an unforeseen consequence).

An analysis of the relationship between components of the existing system and inputs to it revealed that it was the previous stage of instruction that held the key to the problem. The first-year students' practical work included the use of a balance identical in all respects to the one now being used except for one factor - it was very much more robust. The students therefore had a well-learned set of skills and expectations - 'when confronted with this particular stimulus situation, make these responses'. To learn to make different responses to the same stimulus is very difficult - there is a maximum conflict over what to do when asked to do something different. The solution therefore is to change the appearance of the second-year balance (for example, its colour).

Example I illustrates how humans may have to adapt to a system. The new teacher may have produced in the students behaviour (signs to the senior members) which aroused the disapproval of the senior staff. This disapproval was the signal to the new teacher to conform. This is an example whereby feedback stabilizes a situation.

Conclusions from
the examples

Example 2 shows how an analysis of the characteristics of an existing system and those of a new but unacceptable system may be combined to produce an acceptable compromise. The signs of dissatisfaction from the students and teachers given to the curriculum developers caused them to modify the system.

Example 3 demonstrates that the output from one system must be acceptable to the larger system of which it is part. Massive failure by the students in an examination (set by the larger system) would be the sign that the product of the instructional system was unsatisfactory and would call for changes in the activities of the instructional system.

Example 4 is a warning not to take it for granted that the original purpose of a system will not change. Without an adequate feedback and adjustment procedure, individual or group purposes may distort the system's purpose. The sign that would create dissatisfaction would be the non-achievement of the system's purpose.

Example 5 emphasizes that systems analysis is not to be confined to the system of interest. The inputs to that system may contain the cause of problem.

How to improve the learning-teaching system

The systems approach would require attention to be paid to the components of a learning-teaching system in their order of influence. That is to say, consideration should be given to the product and the means of evaluating its quality first, then the activities (the teacher and the student) and finally the resources required.

- | | |
|---|--------------------------------|
| 1. You must know what you want the students to be able to do at the end of the learning experience. Is the product a relevant contribution to a further learning experience or to another system? | The product |
| 2. Some way must be provided by you to 'tell' you and the students when the product reaches the required standard. This may be in the form of an assessment of end-of-learning-experience performance (the teacher assessing the group performance on reading). In this case, the students are told by the teacher how well they did. On the other hand, a special test (examination) may be devised, given by word of mouth (dictation) or in printed form and assessed by marking and allotting individual scores. It is important that the test instrument relates to the product. | Evaluation |
| 3. The capabilities of the students must be known to you. Are they mature enough to be able to do what you want? Do they have the necessary skills to make a reasonably successful start on the activities? Are the activities graded sufficiently well to sustain the motivation by success? | Student characteristics |
| 4. Your presentation method and the students activities must be derived from the end-product required, otherwise the students will be learning something different from what you intended. | Student and teacher activities |
| 5. You must ensure that during the learning experience your students do most of the work. Most of your time and energy should go into the preparation phase. | |

6. Finally, by running through the planned learning experience mentally and considering the nature of the product, the resources required for your presentation method and the student activities can be listed and collected.

Identification
of necessary
resources

- Achievement of the product. This is brought about by the teacher setting two aims: first, for the students - what they will be able to do (later, a section will show how aims may be turned into specific objectives) - and second, for himself, in terms of devising presentation activities and student activities whose aim is the desired product.

Evaluation. Once the characteristics of the product are clearly defined, including the standard required, a series of assessment situations or tests related to the activity stages is devised to tell the student and the teacher when each stage has been mastered. The products of these instruments are evaluated against the standard, and remedial work is provided for students who do not achieve the standard.

Student characteristics will influence the nature of the presentation and the activities. How intelligent are they? What home support can they rely on? Have they mastered the 'tools' of learning, that is, can they understand, remember and act on what they hear? Are they able to interpret pictorial 'messages'? Can they read with the necessary level of comprehension? These are the main ways by means of which information may be presented to learners (information input).

If their response-making skills are considered, can they write essays and logical arguments or can they only copy words? Can they discuss rationally and explain or merely utter isolated words or sentences? Can they sketch and/or produce diagrams to illustrate their ideas?

Teacher presentation. It is helpful to tell and show students what you are teaching and what objectives you want them to achieve but it must be done in a clear unambiguous way which attracts and holds their attention. To do this requires the repeated involvement of the students in the presentation process. There is no need to tell educators that students' attention is liable to wander. This can be avoided by resisting the temptation to talk too long, by asking related and significant questions and by getting students to take some part in the presentation.

Student activities. What the learner does is important. Let us suppose that we wish our students to set up an experiment to verify Ohm's Law during the lesson and to deduce the principle. Later a test is set which involves answering the question, 'state Ohm's Law and describe an experiment to verify it'.

The learning experience involved a practical skill guided by knowledge and a puzzling out of the principle which would have been verified with different values. An account of the experiment may then have been written up with all the data available. The test item calls for the remembering and reproduction of a verbal principle and the writing of a report from memory. Thus the product of the learning experiences did not relate to the product required by the test item.

It is therefore important for teachers to work out the kind of student performance which they feel represents achievement of the aims of the student activity (the aims and performance may be submitted to a colleague for verification as to the relevance thereof). This student performance standard becomes the instrument of assessment. The next step is to analyse the performance (product) in order to determine the learning stages that must be mastered by the students. This is done by asking the question 'Before the students can perform

correctly, what must they be able to do? When the answer (a contributory aim) has been arrived at, the same question is asked again. This procedure is repeated until the existing skills and knowledge of the students are reached. Just as the final (terminal) aim requires a performance of some kind to indicate mastery by the student, so the contributory aims also require appropriate performance to ensure that the desired aim and not some other has been achieved."

The above extract has demonstrated how a system thinker makes decisions at various stages in a learning situation. Instructional media play an important role in providing alternative ways of delivering information and sustaining interest so that learning can take place.

If we focus on instructional media as a component of the learning system, then the information we need to know is:

What characteristics do these media have?
How do these characteristics relate to
the needs of the learning system?

Once we have identified the needs of specific learning situations, we should be able to select various alternative media can be made to play different roles in given learning situations. This leads us to the rule that:

No one medium is best for all learning purpose. A medium may be good in one instance and poor in another instance.

For a practicing teacher, it is therefore necessary to be well prepared by having knowledge of various alternative media from which one or several of your students' learning needs may be achieved. Knowledge of students' characteristics, instructional objectives, and continuous monitoring of students' progress are also essential activities in making decisions about instructional media. This is a systems approach.

FACTORS TO CONSIDER IN MEDIA SELECTION FOR INSTRUCTIONAL PURPOSES

Instructional media selection is a thorny problem. You might find that like many others who implement curriculum that you are in a position of having to consider too many alternative media - all the while having no reliable and systematic basis for the decisions you make. Perhaps like many others you may find that in the end your selection is frequently based on what you are most comfortable or familiar with - which in most cases limits media.

If you have tried to find an answer to the problem of instructional media selection in research findings, that may not have proved very useful either, since much of what has been written is based on specific situations which may be quite different from your own. The research findings are largely inconclusive, and in the final analysis they only indicate that most media can perform most instructional functions while no single medium is likely to have the capability or properties that make it best for all purposes.

This, as you can see, does not get us very far in trying to solve the problem of what media can be selected to make instruction as effective as possible.

The task of instructional media selection is thus complicated for three main reasons:

1. there are many media resources from which to choose;
2. many educators feel they have had a broad enough experience with the range of resources available to have a sound basis for selecting a suitable medium or combination of media for instructional purposes;

3. there are no clear cut guidelines to help in making a selection.

Furthermore, once instructional media are selected, you will need to give some consideration to certain factors in the learning environment that must be taken into account to ensure the effective use of the media selected.

ACTIVITY

From your own experience, list some of the factors in the learning environment which you consider important in influencing the effectiveness of media use. Keep the list and compare these later with what is suggested in the following discussion.

The selection of instructional media is a complex decision influenced by a variety of factors, and therefore should not be based on casual choices. No quick and easy all embracing rule is likely to be developed for this purpose, but we can establish some basis for making systematic, logical, educated choices that will lead to practical and objective media decisions.

In this unit, you will be presented with a rationale for considering a number of factors as criteria for instructional media selection. The rationale identifies a number of salient factors that we consider basic to facilitating objective selection of media for instruction. It is not claimed as the final solution that should be followed in every respect, everytime. Rather, the rationale is offered as a practical framework of the factors to be considered in any systematic procedure of

instructional media selection. The consideration of these factors when selecting instructional media will give you an indication of what media are preferable to others in a given situation. We shall also discuss some of the factors in the learning environment that should be taken into account for effective instructional media utilization.

Media Selection as Part of the Planning of Instruction

The learning process is facilitated by both internal and external factors available to the learner. The external factors when planned for the purpose of facilitating learning constitute what we refer to as instruction. An instructional system then consists of a process of communications and control procedures intended to implement identifiable learning outcomes, which can be discussed as contributing towards the achievement of stated educational goals. The instructional system thus makes use of different channels of communication, blended together to achieve specific objectives, the media used for instructional purposes become part of the overall instructional strategy. Media selection is therefore a part of the process of the planning of instruction, in which various communication channels, including the teacher, are combined to meet specific objectives working in association. Instructional media selection should, therefore, fit at the stage at which you plan the external factors to promote learning as required by a particular instructional objective. This is the stage at which a plan is devised for the various channels of communication to work in association, with each one performing the function for which it is best suited. This view of regarding instruction as a unified process of communication, precludes the traditional approach in which the teacher is a solitary communications agents, reinforced by supplementary subordinate and replacable presentation aides.

In instructional situations, the term media is used to imply all the means available for communicating instructional objectives effectively. Consequently, an instructional programme which defines what the learner who goes through it should achieve, ought to be formulated such that it includes directions on what activities and resources are needed for the objectives to be accomplished.

Instructional media selection is therefore an essential and integral component of instructional systems planning and not just an occasional extra that may be appended during the delivery of instruction without prior adequate planning.

APPROPRIATENESS

One of the first things you will need to consider in selecting instructional media is its appropriateness. And now you may ask how the appropriateness of media for instruction are to be determined? This is largely a matter of matching media attributed to the beginning objective requirements, so that as Kemp (1975) points out, the question of what media attributed are necessary for a given learning objective becomes the basis for determining the appropriateness of the medium.

1. Consider the Media Attributes

The media attributes consist of those essential and optional characteristics of media which contribute to the clarity of the message and its presentation. The consideration of media characteristics involves examination of the media capabilities

capabilities in terms of sensory experience (audio, visual, audio-visual or kinaesthetics) for stimulus and/or response, plus strategy requirement for practice, transfer and feedback during the instructional learning process.

The essential media characteristics, as Romiszki (1974) points out are those which control the clarity of the message. For example the demonstration of high speed manual skill demands a moving visual presentation, and may therefore demand a slow-motion movie presentation. Learning a foreign language vocabulary requires print (to recognise the words) and audio media (to pronounce them). The essential characteristics are, therefore, those in relation to the medium's capability to provide required sensory stimuli such as those of sight, sound, kinaesthetic, smell, and touch. The optional media characteristics are those which enhance or improve the quality of presentation. For example, those media which may be attractive to the learner because of the use of colour, illustrations, animation, and dramatization, or choosing media which suit the learners' study habits. For example, a learner may learn better from print than from spoken word. Gerlach and Ely (1971) list other media characteristics which determine their utility and need to be taken into account during media selection. These include:

- (a) The fixative property: recording, reproduction and playback capacity.
- (b) The manipulation property: transformation of an event, for example, speed up (time-lapse) slowed down (slow motion) arresting action (e.g. in-still photography or "freezes") reversal of action (as in film run background), and provision for editing.

- (c) Distribution property: capacity to transport an event through space (for example transmission via radio waves).

2. Consider the Learning Task

Knowing the media attributes is only one side of the coin. We must also consider how these can be matched to learning objective needs in order to facilitate media selection. Here we must turn to instructional design theory.

The outcome of instruction is the acquisition of a variety of learned capabilities by the learner. There are various classifications of these learned capabilities, but for purposes of this discussion we shall make use of the classification used by Gagne (1975) or Gangne's and Briggs (1974), which categories the capabilities as: information intellectual cognitive strategies, motor skills and attitudes. Each of the various learned capabilities requires certain conditions for its learning or acquisition.

The objectives you set for instruction will fall under any one of the learned capabilities discussed by Gagne. The conditions required for facilitating the acquisition of the capability desired in the objective becomes your take off point for considering the appropriateness of the external events, including media, which will promote its learning. The conditions constitute the learner-objective needs. Your concern here is with the learning objective and the conditions and stimuli, as well as the strategy considered suitable regarding practice, response, transfer, and feedback, that will lead to its accomplishment.

There are several considerations that you must keep in mind at this stage. First, you need to consider both the terminal learning and each of its sub-objectives (enabling objectives) and to determine the stimuli and conditions of learning requirements for each. Secondly, for each learning objective and sub-objective you will need to consider what stimuli and conditions will be required for each of the events of instruction from activity to learner's motivation through to providing feedback.

You may have noticed from all the previous considerations discussed, that a medium that may be suitable for one instructional function may prove quite unsuitable for a second function within the same sequence. This suggests that you may have to consider a variety of media for a given sequence, with each assigned to the most suitable use at a specific point in the learning sequence. This becomes particularly important in considering combinations of interpersonal channels and mass channels to compliment or reinforce each other in strategy requirements for motivation, presentation, practice, response, transfer and feedback. Complementary or multi-media combinations are always necessary in instructional media systems since no medium has the capability to perform all instructional strategy requirements efficiently. This will normally result in the identification of clusters of three groupings of media.

1. Primary: those which are identified as the most effective means of attaining an objective.
2. Supporting: those which are identified to be an essential compliment to the primary media.

3. Alternative: those which may be substitute for the primary or supporting media when circumstances do not permit the use of the optimum method.

The appropriateness of the medium in relation to the learning task will therefore be determined by how well it is matched to:

1. the type of conditions and stimuli required which dictate the sensory channels to be used for presentation; and
2. the practice and response required of the student.

AVAILABILITY

Identifying instructional media on the basis of appropriateness will give you a list or lists of all media ideally suitable for accomplishing the learning objectives. In most cases you will find that you have got more than one media identified as appropriate for a given function. The acceptable media options, as determined by results from this basic selection, must now be considered in terms of existing constraints. On the basis of these, a number of choices will probably be eliminated. Availability of the media will probably be the major eliminating factor, unless you have access to well stocked resource centres. The media identified must be available to the learner at the specific time they are required for a particular learning sequence. Those media which we cannot be certain will be available when called for, should not be considered. It is not much use selecting a text, for example, which may be in the bookshops or at the curriculum development centre but which for

any number of reasons may not be available to the student. Equally, it serves no purpose to select a scheduled radio programme, which may be available in your local broadcasting station but is unlikely to be transmitted at a time appropriate for a particular learning activity. It is best to consider such material unavailable and consider other alternatives unless you are certain that the programme will be transmitted at the specific time it is required or the learner can obtain a taped copy of it to use as convenient. Here availability must be considered in relation to the learner. It is not enough that textbooks may be available in shops or that schools have radios. The issue of availability must be considered in terms of factors such as the economies of the institutional structure, the existing infrastructure, or timing, that are likely to affect it.

It must be pointed out that whereas in considering appropriateness, the main concern was only with the software, when it comes to availability we must think both in terms of the software and hardware. Suppose you were able to locate or produce a series of films which are excellent from the point of view of appropriateness and you were even able to make the prints available to your learners in good time, but come to discover that the films have magnetic soundtracks. Your efforts would be nullified if the hardware available is inappropriate. The same would apply if broadcasts or audio or video cassette tapes with appropriate material were available but not the necessary hardware. Therefore, it is important that you ascertain availability both in terms of software and hardware. We must check on the demand for their use and whether the learner will have access to them in view of competition from other possible users.

Here again, a word of caution is necessary about materials that must be specifically developed and produced for designing new curricula. Many of us are probably familiar with a situation where the implementation of a new curriculum has been launched while the materials intended for use were still held up in the production or publication process. Needless to say, a familiarity with the material production process and its time requirements are necessary, and the scheduling of the launching of the new programme should allow the maximum possible time for production to ensure that the necessary materials are available, so that everybody's efforts do not result in futility.

If commercial or other packages of instructional media are to be used, they must be checked to ensure that the guides, workbooks, multi-media material, and whatever else is called for, are included. This applies also to educational broadcasts which have accompanying support materials. All items should be available when required.

Another consideration is whether the materials required are already available or if they must be developed. Quite often, some may be available but probably not in the form desired. Some "on-the-shelf" material may be put together to make a "model" but will need to be supplemented with the preparation of certain components such as practice exercises, tests and so forth. Here, you will have to make the decision as to whether the preparation time will allow you to develop entirely new materials, modify those existing, or whether you should find alternative media.

Summary

In this unit we defined the concept "systems approach" and gave examples of how the concept can be used in the organization of a teaching-learning situation.

We also related the systems approach methodology to the use of various media for instructional purposes and what factors need to be considered in making an appropriate media decision for improving the effectiveness of the learning process. We found out that the approach provides for flexibility in the choice of media when we consider various factors in the learning situation as part of the decision.

UNIT THREE

EDUCATIONAL TECHNOLOGY IN AFRICA AND OTHER DEVELOPING COUNTRIES

OBJECTIVES:

By the end of this unit, you should be able to:

1. identify the various types of traditional African media and explain their role in education;
2. list the different types of imported instructional media and those that are in use your home country at all levels of instruction;
3. explain the problems associated with the use of available imported instructional media;
4. explain the problems associated with the supply and demand of teaching materials in your country;
5. gather information on the types of instructional media available or needed your country or institution.

The problems associated with the task of improving the quality of education in Africa are similar to those experienced by other developing countries. These problems include: a high demand for schooling against limited resources; shortage of teachers; facilities and money; lack of a clear policy on the supply and use of instructional media; rapid economic change, and traditions which are often resistant to change.

Although these problems appear to be very different so as to require separate solutions, their overall effect shows that they are all related to each other. Therefore, as we focus on the state of instructional media in Africa in this unit, you should bear in mind that various factors related to the socio-economic status of each country also affect, in certain ways, the supply and demand of instructional media in each nation.

In this unit, we will attempt to study how these problems affect the use of traditional African media as well as modern or imported instructional media in improving the quality and effectiveness of education in our institutions.

The term imported is used purely for the purpose identifying the media types. If you were in Britain, America or Japan, the items you would use in the concept imported would be quite different. The term is used here to define the instructional media hardware and software which are manufactured into final products in countries outside Africa, such as in Europe. Over the years, these products have found their way into African educational systems. Since most African countries still rely on these items, we shall continue to refer to them as imported. These include, for example, overhead projectors, film projectors, radios, and television sets.

Traditional African media on the other hand are those media types of communication which are authentically African, such as folklore, songs and dances, and others. These vary from place to place in Africa.

Let us ask ourselves this question:

IN WHAT WAYS CAN EDUCATIONAL MEDIA, BOTH LOCAL AND
IMPORTED, BE USED TO PRODUCE IMPROVED RESULTS IN
EDUCATION IN MY COUNTRY?

Generally we can assert that in most African countries, the availability of imported instructional media is sporadic, while the usage varies from institution to institution. The elementary schools, on the one hand, tend to use much of the local and traditional media (particularly the rural schools), while institutions of higher learning such as some of the universities and training colleges have advanced their instructional technology to compare with any modern educational institution in the developed countries.

In the question we have just posed, the word local is used to include what we have defined as African traditional media, as well as the media types that are locally available in the community where the educational institution is located. What is not available in the community is therefore categorized under the concept of imported, as defined earlier. This will vary from situation to situation.

To answer the question we posed, we will examine the historical context of African traditional media and various ways in which these media can be incorporated into our instructional systems. Imported media, and how problems related to it can be overcome, will also be discussed.

HISTORICAL CONTEXT OF TRADITIONAL AFRICAN MEDIA

Traditional African media may be defined as the means by which the traditional African curriculum was implemented. Men, tools and materials were employed to prepare young people for full membership in their community. Although the idea of men, tools and materials for learning is universal, African traditional

media differs from Western media in two fundamental ways. The western media is based on high technology through their long history in industry. The second is the art of literacy. These two innovations ushered into Africa a period of change in the methods of doing things and brought about new expectations in the educational systems. Elements of the old or traditional media still exist side by side and are sometimes in conflict with the new Western media.

Can you identify some of the surviving elements, and how they conflict with or complement the new influences?

Of the two, literacy has been less difficult to adapt. Technology on the other hand, has formed the axis of all African developmental problems. It is argued that until technology is localised, no real industrial revolution and material progress can be made. There are no simple solutions to this problem.

Before the introduction of western technology and literacy, we identified the instructional media which were part of African traditional societies. It is important to emphasise that there was no uniformity in their use in all African societies. Local conditions made variations inevitable. Among the Maasai of Kenya and Tanzania, for example, a nomadic way of life elevated the skills of warfare and hunting above all others. The education of the Kikuyu on the other hand, was characterised by farming and initiation into the various age groups as dictated by the needs of a settled as opposed to a nomadic society. The fullest picture of African traditional education and media should ideally come from a study as many such communities as possible.

Types of traditional media:

(i) Learning Through Play and Other Youthful Activities

Children played games in which they imitated the roles they would assume in maturity, for example husband and wife roles. They learned to make models of things around them; spears, bows and arrows, mud huts, and cooking pots. This took the form of both individual and group activity. Many of these activities survive today. Can you, identify any of them from your own experience?

(ii) Learning Through Productive Work

This was essentially an apprenticeship system in which youths learned skills for both production and sport from elders. Boys learned how to make spear, bows and arrows and the art of fighting for defence of their societies. Girls were trained to become good wives and mothers, to make baskets, to grind millet, to make clay pots and to till the land. Special skills such as medicine and prophesy were imparted to carefully selected young people who possessed special talents.

(iii) Oral Literature

The wisdom of the clan or tribe was handed down through fireside stories depicting myths, legends, fables, proverbs and folk tales. These helped young people to distinguish between good and evil for the individual and society as a whole. How much of this activity survives in your society?

(iv) Folk Songs and Dance

These were not just for enjoyment. Often, they carried disguised messages of good citizenship, communication of complex ideas, and as an outlet for creative talents.

(v) Initiation and Other Ceremonies

The purpose of these was to instil the social and aesthetic values of a clan or tribe and to prepare the youth physically and mentally for survival in harsh environments. One of the toughest ceremonies was circumcision. Thus, pain and fear were vital media for character training.

(vi) The Environment

Names of trees, plants, animals, insects, types of landscape and the numerous ingredients of the earth were learnt. In this way, the youth knew the most useful and the most dangerous ones.

(vii) Other Forms of Communication

As we have already noted, learning in African societies was a life-long process lasting from birth to death. Numerous symbols, gestures, and noises, were used to convey information. We have all heard of the talking drums of West African, the yelling noises and drums of war of Buganda, and many others. Among the Maasai, an approaching stranger was regarded as an enemy if he did not carry a bunch of grass. The literature of African tribal life is full of many more examples of this type of communication. Can you enumerate some more?

The seven categories enumerated here are by no means mutually exclusive. Indeed, many of these areas overlap. The divisions are only a convenient way of describing the learning environment of African traditional societies.

Conclusion:

Traditional African learning was truly media-based, much more so,

in fact, than the classroom-teacher-desk-paper and pen learning introduced by the missionaries and colonial governments. The negative side of the introduction of literacy is that it retarded and, in some cases, destroyed other instructional media which were vital for the economic welfare of society. African learning was essentially the acquisition of knowledge through doing things, especially the production of goods and the provision of services which were vital for a group's survival.

Today we are trying to retrace our steps back to our own environment as the basis for learning. Only this can provide the impact for faster economic development and education for living. One way in which this is being done is the promotion of the concept of intermediate or appropriate technology. In the classroom, this means the use of simple, relatively inexpensive home-made aids for learning instead of the use of imported expensive materials such as computers, or video tapes. Similarly, oxen-drawn ploughs can replace tractors on farm lands. But if we have to get anywhere, a compromise must be found between intermediate technology which is advocated by most development specialists, and high technology which is being sold to us by Western multinational companies. We need to resolve this conflict. Can you think of any locally made aids for teaching? Has their use improved learning compared to chalk and talk?

Another important point we learn from traditional African media is that learning at all stages was based as much as possible on the active participation of the learner. Any media used, whether in apprenticeship or through play, attempted to relate it as closely as possible to real life. Therefore, the traditional media was complete in the three domains of learning, that is, the cognitive (information), the affective (attitudes and feelings),

and the psychomotor (skill performance). If we use this as a basis from which to evaluate western technological media in the African environment, then we have a strong justification for using ideas in traditional African media to improve on the western influences. The elements of active learner participation and reality are needed to make learning more meaningful and successful. The tools for achieving this process lies in aspects of the traditional African media as well as in some of the new media.

HOW HAS IMPORTED TECHNOLOGY INFLUENCED THE USE OF INSTRUCTIONAL MEDIA IN AFRICA?

In most African countries, the impact of western technology has been so overwhelming that the educational systems which one would find today have little or no resemblance with the traditional systems. New needs have arisen, leading to fresh procedures of how the solutions can be arrived at.

What therefore comes to most people's minds when the concept instructional media in Africa is mentioned are the media used in teaching and learning situations as derived from western technology. With the current awareness about the need to return to tradition, the trend seems to be in two directions:-

- i) to rediscover those aspects of traditional media which can replace expensive and rare western technology in the learning institutions,
- ii) to adapt aspects of the new technology whose role cannot be replaced by traditional media for example textbooks, and projects.

Both of these directions are complementary, that is, there is as much a need to look at traditional culture as there is in adapting what needs to be retained from western technology.

The concept of appropriate technology was introduced in unit one. Let us see where a compromise can be struck between imported technology and traditional media. To do this, you need to recall what was said about a system approach and instructional media decisions in Unit Two. Briefly, we said that effective media decisions start with identification of the learning task that has either been successfully accomplished or not.

Consider the following:

- 1) What is the ideal learning situation for the present and the future?
- 2) What are the instructional media implications for that situation?
- 3) What do they cost?
- 4) Can we afford them and under what circumstances? For instance, if we were to make a 16mm film for one school it would be very expensive. If the film were envisaged for the entire nation then this would be quite reasonable.
- 5) How do we plan the use of the identified instructional media? Can these be easily produced in large numbers?

- 6) What is the variety of imported instructional media?
What can it do to solve the learning needs?
- 7) What traditional media exist for the same learning
needs?

As you ask these exploratory questions you should remember that media does not function in a vacuum. It functions within the context of the type of curriculum, its objectives, and relatedness to the local environment. Therefore the objectives, and content of any instructional system or curriculum determines the scope of instructional media that can be used.

Activity: For your own further learning of the relationship between imported and traditional media, examine the following list of instructional media using a number of educational institutions near you. For each item, indicate whether it is available locally, available but imported, or unavailable. An assessment of the frequency of scores on each item will indicate the state of media in the environment you have examined.

Add other items to the list which are available in the local environment.

A VARIETY OF INSTRUCTIONAL MEDIA

PUT A TICK (✓) FOR EACH ITEM THAT IS EITHER AVAILABLE LOCALLY, AVAILABLE BUT IMPORTED, OR NOT AVAILABLE	COLUMN I	COLUMN II	COLUMN III
	AVAILABLE LOCAL	AVAILABLE IMPORTED	NOT AVAILABLE
1. <u>PRINTED MATTER</u> (Other than reference) Trade books Textbooks Programmed books Printed programmes Machines Work sheets and outline Maps Reading kits Pamphlets Periodicals Newspapers and clippings Picture in books and magazines Other (name)			
Dictionaries Atlases Encyclopedias Almanacs Catalogues Manuals Courses of study Units of study Other			

PUT A TICK (✓) FOR EACH ITEM THAT IS EITHER AVAILABLE LOCALLY, AVAILABLE BUT IMPORTED, OR NOT AVAILABLE	COLUMN I	COLUMN II	COLUMN III
	AVAILABLE LOCAL	AVAILABLE IMPORTED	NOT AVAILABLE
2. <u>TEST MATERIALS</u> Practice Tests Standardised Tests Teacher-made Tests Textbook Tests Other (name)			
3. <u>CONTENTLESS MEDIA</u> Construction paper Drawing paper Writing paper Paints Crayons and chalks Pencils and Pens			
4. <u>FLAT GRAPHICS</u> Charts (prepared) Posters Pictures Diagrams Wall Maps Chalk-wall easels Bulletin Boards Flannel Boards Magnetic Boards Other (name)			

PUT A TICK (✓) FOR EACH ITEM THAT IS EITHER AVAILABLE LOCALLY, AVAILABLE BUT IMPORTED, OR NOT AVAILABLE	COLUMN I	COLUMN II	COLUMN III
	AVAILABLE LOCAL	AVAILABLE IMPORTED	NOT AVAILABLE
5. <u>THREE DIMENSIONAL MEDIA</u> Globes Models, Mock-ups			
6. <u>APPARATUS</u> Laboratory Equipment Realia Toys, Games, Puppets Sculptures Other (name)			
7. <u>AUDIO AIDS</u> Musical Instruments Records and record players Language Labs Earphones and Loud speakers Educational radios Radio (commercial) Tapes and tape recorders Educational programmes on tape Other (name)			

PUT A TICK (✓) FOR EACH ITEM THAT IS EITHER AVAILABLE LOCALLY, AVAILABLE BUT IMPORTED, OR NOT AVAILABLE	COLUMN I	COLUMN II	COLUMN III
	AVAILABLE LOCAL	AVAILABLE IMPORTED	NOT AVAILABLE
8. <u>VISUAL AIDS</u> Opaque Projectors Filmstrip Projectors Slide Projectors Slide and tape combinations Movie Projectors Overhead Projectors Prepared Transparencies Filmstrip viewers Slide viewer Rear screen projectors Other (name)			
9. <u>AUDIO-VISUAL AIDS</u> Television-closed circuit Sound movies Filmstrips with synchronised sound Other (name)			
10. <u>SCREENS</u> Projection screens or wall Moveable, overhead screens Wall-movable screens Other (name)			

Having examined your environment and identified what is available on the basis of the list of instructional media mentioned above, you may now be wondering why one should bother about so many media items that are unlikely to be found in any one place.

To resolve that problem, one needs to view the role of media in instruction at two levels:-

- Macro-level where one evaluates media from the national point of view, and
- Micro-level where media are evaluated from the classroom position.

Without making this distinction, it is difficult to justify the cost against the possible educational value of the media.

At micro-level the locally available little media such as improvised models, drawing paper, newspapers, workbooks, can be justified. The macro-level includes media such as films, radio and others which require a very heavy investment in production but may be required on a nationwide basis with control from a central place.

Most traditional African media would be found at the micro-level where the teacher is in control.

PRODUCTION

All media, whether local or imported originates from some source. In the case of the imported media, production sources are outside Africa. We only receive a complete package. There are other media, particularly those which have been adapted to local use in instruction, which are produced in various African countries. Some of these production centres are outside the school systems

while other media such as picture, charts, posters, newspaper cuttings, models and so on, are produced by the teacher for his own teaching purposes.

Let us note what Bretz says about the differences between local production and centralised production in A Taxonomy of Communication Media:

- 1) "Local production can respond quickly to local needs. This is important since needs often appear suddenly.
- 2) Local production can be highly specific. Production can be tailored directly to instructional needs.
- 3) Local production can be rapidly evaluated in practice and rapidly revised.
- 4) Local production is more democratic. Each learning situation has a right to use materials it is best suited for.
- 5) Locally produced materials tend to be better utilised. Teachers have better ideas of how the materials can be integrated with what they have to teach.
- 6) Locally produced materials can incorporate familiar surroundings, therefore they have a greater degree of relevance."

Bretz goes further to write about the disadvantages of local productions. At the sametime we learn about the advantages of centralized media productions.

The disadvantages of local production are:-

- 1) Local production is generally characterized by a low level of production quality. The production techniques employed are usually non-professional in quality.
- 2) The costs of long-range effectiveness cannot be justified for limited local uses.
- 3) Local production, specific to local needs, generally has low commonality. What is produced may not be used in other environments.
- 4) Local production is limited to simple techniques".

It should be noted here that, there is a need for local production and centralized production. Both types of production have advantages and limitations. However, when we apply these benefits are applied to the range of media, it becomes easier to sort out where local production is necessary and where centralised production would be more cost-effective.

Summary

In this Unit on educational technology in Africa, we looked at the historical context of instructional media, both imported and local. The problems in the utilisation of both types of media were discussed and it was indicated how aspects of traditional African media could contribute to learning situations.

The contemporary media situation was described and a list of possibly available media in our educational systems was developed.

Finally, a distinction between local and centralized production and the effect this would have on production and ease of use in the classroom was made.

UNIT FOUR

MASS MEDIA IN EDUCATION

OBJECTIVES

At the end of this unit, you should be able to:

1. explain the different types of mass media;
2. explain their possibilities and shortcomings when used to achieve various educational goals;
3. describe the conditions of efficiency in using the mass media in education;
4. explain the procedure of proper planning in using the mass media;
5. analyse the possibilities of using the mass media to achieve various educational objectives in your country.

What are the mass media?

Mass media are the channels used for disseminating information from a source at a central station to people in distant places. They are message carriers such as radio, television, newspapers and films. Radio and television are electronic media, while the newspapers are print media.

All these media are in use in most African countries although their degree of effectiveness in playing the role of message carriers for the majority of each nation's masses varies from medium to medium, and nation to nation. The print media are affected in their dissemination effort by literacy levels of their audience and by road or other transportation facilities for providing access to remote parts of the country and variations in languages spoken in each country.

Radio, on the other hand, is able to transmit messages to distant places faster than print. It also reaches more people because it is not limited by one's ability to read.

The only condition for its use is that there must be enough radio receivers within reach of most people for the medium to be effective. Although radio receivers are considered cheap by western standards, in many parts of Africa they have not reached every household because they are an expense which only those who have an income can afford. Compared to other mass media, radio reaches more people in most African countries. Television is on the increase in many parts of Africa, although the number of television sets is so small that the impact of the medium in many situations is inevitably restricted to a certain socio-economic status only.

Films are considered part of the mass media from the point of view that when they are produced for the public in general they can be transmitted to the masses on television, in cinema halls or by mobile cinema units. In this way, they play the role of mass media as public message carriers.

Books, posters and other print materials are also considered part of the mass media when they are directed to the public in general.

Due to the easy access to the public some of these media provide, educators have considered different ways in which these media can serve educational goals. The main reason why there has been such a strong interest in the mass media for education in Africa in the last fifteen years is that the formal educational system cannot perform all the varied educational roles as required by a developing country where the needs for such

education are very diversified and urgent. The process of national development depends heavily on the educational system for providing the nation with enlightened people who possess skills which can be used to perform various tasks.

Within the formal educational system, there has been a need to inservice teachers and improve the quality of instruction by transmitting programmes in areas where other methods of teaching are not effective. The mass media have therefore become the focal point where all types of educational needs converge.

Some of the areas in which the mass media have been used in education in Africa are:

1. The re-training of teachers already in service
2. Agricultural education
3. Social education
4. Literacy teaching
5. The teaching of mathematics, history, geography and other school subjects to pupils in schools
6. Higher education (tertiary) for those unable to attend institutions of higher education.

Information and Instruction

While thinking about the mass media in education it is important to distinguish between information and instruction. Both concepts seem to be implied in the different daily meanings of the word education. It is common to hear people refer to a documentary radio or television programme or film as educational, and, a series of radio programmes on how to keep accurate accounts in a cooperative society, as educational too. Both programmes have one thing in common: that is, they provide new

knowledge. The general documentary film provides information which is "good to know" but may not be of immediate use to the audience, and the audience may not be required to respond in any specific manner. The other so-called educational programme which may be a series geared to increasing the audience to a specified level of proficiency in the subject, usually is structured such that the audience is expected to respond by behaving in some specified manner as a result of the programme message. This is an instructional programme.

The difference between information and instruction is important when thinking about the mass media because, when we consider some of the areas listed above where the mass media have been applied, we find that although all are educational, some of them are information and others instructional as defined above. The programming procedures are different in each respect. For instance, although feedback is important in both types of educational programmes, instructional programmes require more detailed follow-up procedures, often leading to certification or performance of certain skills or operations, while information programmes only provide general knowledge which is "good to know" for the future. Instructional programmes often are accompanied by support materials such as reading texts, workbooks, pictures and maps, to ensure successful learning.

Curriculum planners who work in the area of instructional media and the mass media in particular need to get acquainted with both types of education as defined above so that they can plan for each accordingly.

Selection and Use of the Mass Media

The general assumption when one opts to use the mass media in education is that other instructional media and the traditional

classroom situation are either inadequate or unavailable for the particular objective to which the mass media is being applied. Thereafter concern is in identifying the medium which is most appropriate and convenient for the message as well as the target population. As far as the target population is concerned, one needs to know whether the selected mass media are easily accessible to them or not. Other decisions are made on the basis of what is possible within each mass media alternative in terms of message form and structure. The curriculum developer therefore, needs to have good knowledge of the different types of mass media, their characteristics, types of audiences, their preferences and abilities, their characteristics of visuals, and role play.

The "Third European Broadcasting Union (U.B.U) International Conference on Educational Radio and Television" which was held in March, 1967, noted in its report the following factors on which specific research information is needed for better educational use of the mass media. These are:

1. Visualization: It was noted that since all subjects do not lend themselves in the same way to visualizaiton, depending on the skill and type of knowledge to be conveyed, visual treatment will be different. The following questions need to be asked in this regard:
 - (a) What are the different technical devices for visualization (diagrams, special effects and mock-ups?
 - (b) How necessary and effective are they in relation to the subjects taught and the level of the audiences?

2. Motivation: The questions here are:
 - (a) What are the main examples of motivation processes?
 - (b) How necessary are they in relation to the subjects taught and the level of audiences?
3. Participation: The mass media, it was noted, tend to render their audiences passive in their one-way process of communication. To get away from this the following questions need to be asked:
 - (a) What are the different participation techniques?
 - (b) What are their variants in relation to subjects and audiences?
4. Environment: The report also observed that knowing the social and cultural context of the audience is necessary before undertaking any educational work. Therefore, there is need to ask as follows:
 - (a) What is the interaction between specific educational radio and other mass media programmes and the whole range of audio-visual messages reaching the pupil?
 - (b) How is a pupil affected by his family, social, geographical, and historical background?

Support Material for Broadcast

Radio in most African countries is the mass media alternative most popular in use for educational purposes. But since radio conveys its messages in one form only - the audio form - there is need for proper and careful planning before it can be effectively

utilized to achieve its goals. Much effort in planning for effective use goes into preparation of support materials which the student audience should have, especially where it is being used for instructional purposes. Other planning is directed at preparing guide notes for teachers who use the broadcasts in their teaching. A related planning problem in most African countries is the technical problem of poor reception in places which are far from the transmission stations. The solution for this problem so far is to provide a taping service as an alternative to listening to the broadcast directly.

The following article entitled The role of accompanying material in support of broadcasts by F.N. Lloyd Williams, Head of School Broadcasting, BBC, is taken from the report of the "Third E.B.U. International Conference on Educational Radio and Television". O.R.T.F. Paris, 1967. The article summarises the integral relationship between support materials, the student and the teacher, outlining the utilization procedure. The example given is that of an instructional broadcast.

THE ROLE OF ACCOMPANYING MATERIAL IN SUPPORT OF BROADCASTS

1. Recent tendencies

During the last few years there have been two tendencies:

1. for support material to be more closely integrated with the broadcast;
2. for the planner/editor to direct his attention not only upon the period of the broadcast with a few broad suggestions for what might

happen before and afterwards, but upon a much longer period of an hour or more, an entire educational operation, and to take responsibility for the planning of the whole of this.

2. Before and during the broadcast

1. Before and during the broadcast the role of support material for the teacher to provide:
 - a. a statement of the philosophy and aim of the series, particularly when the approach to the subject or its treatment is relatively new;
 - b. a short but firm statement on the aim of each separate broadcast;
 - c. a description of the contents of each broadcast, including a note on any point, for example, of some sensitive matter in religion, politics or sex, for which the teacher might particularly want advance warning, and indicating the general structure of the broadcast so that if he tape-records it he can use only part of it at a time if he wishes.
 - d. a statement of any concrete practical matters the teacher should arrange for beforehand, for example the availability of objects for experiments or demonstrations during the broadcast, and of maps, pictures, or drawings.
 - e. a statement of any desirable preparation of the class in the form of discussion, reading, or experiment.
 - f. a statement of what action will be required of the teacher during the broadcast, including an indication of any difficulties likely to be met by the class during the broadcast which may require the help of the teacher, for example particular passages in a song;
 - g. pictures indicating the quality of response to be expected from a class. for example in movement;

- n. a note of proper names, unfamiliar vocabulary, or technical terms.
 - i. answers to questions posed in the broadcast or in the pupils' booklet;
 - j. additional comments which will help the teacher himself to understand more fully the subject of the broadcasts, for example a poem.
2. Before and during the broadcast, support material for the pupil is not normally required for television, but for radio its role is to provide:
- a. much of the material under 2.1 above if the teacher is not present;
 - b. visual material as a basis for the imagination or for comment by the broadcaster, for example in art, geography, science, movement, or languages. This can be a picture in a book or on a wall, or in some cases puppets, cut-outs, flannelgraphs, or everyday objects. There is a danger that a picture will restrict and trivialize the imaginative experience arising from a work of literature, but with the right selection it can usefully affect the tone of the experience and can extend and deepen it;
 - c. textual material which will help many pupils to fix their attention upon, and to hear and understand more fully, broadcasts of their local literature, especially poetry, and of foreign language material. The provision of texts extends the range of difficulty of the material which can be presented to pupils;
 - d. enable songs to be taught and, further, songs to be taught in parts and accompaniments to the songs to be played on pitched and unpitched instruments. Again the textual material extends the range and complexity of what can be taught;
 - e. enable mathematics, or reading (for adults), to be taught by radio.

3. After the broadcast

1. After the broadcast the role of support material for the teacher is:
 - a. to indicate some possible starting points for discussion and other activity;
 - b. to lay down a more defined and extensive programme of activity;
 - c. to provide a course book guiding the teacher in the whole of his work on the subject;
 - d. to provide material which may be undesirable to broadcast on the open air, but can properly and usefully be introduced into the classroom if the teacher thinks fit;
 - e. to provide additional background material.
2. After the broadcast the role of support material for the pupil is to provide:
 - a. visual material as a basis for recapitulation, discussion and activity, using still pictures or 8 mm film-loops. This may be additional material - pictures in the pupils' booklet, or slides or film-loops - not already dealt with during the broadcast;
 - b. texts for further study, including texts to read, which is the culminating activity to which, for example, a broadcast for backward readers has led up to;
 - c. a course book as a basis for most of the later classwork in that subject;
 - d. visual and textual material which can be absorbed into pupils' scrapbooks or taken home as their private possessions, so that seminar materials of a higher quality than normal is carried to the pupils' homes;
 - e. discs or tapes for pronunciation practice in language courses or singing practice in music; further development of material already

broadcast, in order to take, for example, the teaching of a song to a higher level of sophistication; used in teaching machines;

- f. closely programmed material, which may be largely self-correcting, for use particularly in subject areas where teachers are not fully qualified, or in circumstances where no teachers are available;
- g. activity material in the form of cards and other forms of cut-out material for use as educative games; kits of simple apparatus for experiments especially in science;
- h. checking of progress by means of question papers distributed periodically by the broadcasting organization;
- i. further full development by means of correspondence courses.

4. Effectiveness

Support material, however ingeniously prepared, is not effective if:

- 1. it does not reach the educational institution in time;
- 2. it reaches the institution but does not reach the relevant teacher;
- 3. it reaches the teacher but is not read or properly studied by him.

5. Relationship with the teacher and pupil

- 1. it reaches him as far in advance of the broadcast as he requires; this may mean that the material for a whole term has to reach him a month or more before the beginning of the term, or it may mean that material should reach him fortnightly or monthly.
- 2. it is wholly reliable, especially in foretelling exactly what will be in the broadcast;

3. its lay-out is such that he can see immediately and clearly what he wants to know;
4. its tone is that of a responsible professional speaking to his equal;
5. if while giving firm guidance it still by its tone makes teacher and pupil feel free, and while giving full information still allows the broadcast to contain an element of surprise;
6. it provides for a two-way exchange of opinion and experience between broadcaster and teacher.

6. In general

The development and elaboration of support material has:

1. greatly increased the amount and complexity of the planner/editor's work but has been accompanied by a clarification of his aims and an improved understanding of the media at his disposal;
2. greatly increased the power and range of educational broadcasting and played an essential part in its development into a sophisticated instrument which can, if required, use both television and radio, live or recorded, together with support material of several different kinds in a single comprehensive educational operation - team teaching on a grand scale - each contributing in its own particular way.

A word about overall production planning

Regardless of the type of mass media in use for educational purposes, it is important to involve representatives of all the essential components of the whole process from production to utilization. The media producers, subject consultants,

evaluators, policy makers and users need to be part of the team to provide input. Without such a wide base of representatives, there is the possible danger of the product (programme) being of very high technical quality but little educational value when viewed in terms of the stated educational goals. The type of combination of skills and expertise would usually vary depending on the subject and form of the expected product.

The programmes or schedules must be planned well ahead of the dissemination time to allow adequate period for the necessary inputs. Consideration for appropriate air time, the nature of support material and methods of contact with the users are all important.

The nature of inbuilt participation and motivation and vocabulary level and language should be treated with care. The tendency is to focus all efforts on the content, ignoring these points which make a whole difference on whether the target audience will participate or ignore the programme.

The research component, whether by consultation or part of the establishment, should be included in the team from the initial stages.

The following documents by Hassan Akrouf, the Tunisian Director of Television, and Eric Adjorlolo, of the Ghana Broadcasting Corporation on The Development of Educational Radio and Television in Africa is taken from the "Third E.B.U. International Conference on Educational Radio and Television, 1967." Although the report is about fifteen years old, it is important because it provides glimpses into the expectations and orientations which most African countries had in choosing the broadcasting mass media for education.

Situations are likely to be different now. As you think through the document, try and write down what uses the mass media have in your country, and compare them with what you read about other countries.

THE DEVELOPMENT OF EDUCATIONAL RADIO AND TELEVISION IN AFRICA

(by Hassan Akrouf)

General introduction

The report which my colleagues from Ghana and myself have the honour of presenting to you here is not to be considered as being comprehensive in any way whatsoever.

It is a very approximate approach to the situation of educational radio and television in Africa.

We shall endeavour to determine what part radio and television can play in a developing country and to define their mission. We shall also mention a few examples of what has been done in some of our countries and the difficulties we met when setting up educational and school radio and television services.

In African countries, today considerable changes are taking place. Some people call them "revolutions", others consider that they represent an "evolution". However, the main point is that -at all levels of society, modifications and transformations are happening all the time and at great speed. Values are changing, traditions are being questioned, social mobility is upsetting social structures, individuals are sometimes at a loss and bewildered, not knowing which set of values to rely on, nor what traditions to believe in. Society really seems to have reached a breaking point.

Faced with this situation, radio and television have an extremely important part to play. This is why I would like to insist more particularly on the idea that a Radio and Television Organization -just like the other mass media -carries a heavy responsibility. It can have no other mission than to help in the advancement of mankind and to support continuous education.

It seems obvious that, faced with the situation we have just described, what radio, (and the same is true for television), must do, is to help man become a harmonious part of society and to help bridge the gap between rural and urban populations.

Another characteristic feature of our countries is that very often certain populations live in complete isolation. Some villages and rural settlements situated in the desert, on mountain tops, or in the depths of forests, are completely cut off from the rest of the country. Their only means of communicating with the rest of the world is through radio and television. What the latter should do, therefore, is to enable these populations to become integrated and to feel a part of the society to which they belong.

Breaking down this seclusion also means that progress will now be possible as no society or group, or even individual, should remain untouched by development.

Our only hope is to trust all the active forces in our populations, to canalize them and to direct them towards development and wellbeing. Information is the final answer in the fight against the scourges of ignorance, illiteracy and underdevelopment which are barriers to progress.

Here, naturally, educational radio and television as such, have a particularly important part to play. As we shall see later, many countries have already made some efforts in this direction. Others are so active in the educational field generally that they have had to increase the number of schools, teachers, and research centres, and are now also turning to the possibility of using audio-visual methods to help with achieving general literacy and to enable every citizen to enjoy a minimum of learning.

But already, before having taken advantage of radio and television with a didactic purpose, our various organizations have done a great deal of work in acquainting populations with modern methods and techniques. We have had to show popularization programmes in all our countries on health, agriculture and economics. We had to make it possible for women, men and children to understand the new dimensions of life.

We should like to stress another important fact in Africa today, namely that culture has been the privilege of a minority of people who are well off and have the possibility of going to plays, films, exhibitions and any other cultural event. This is why the mission of radio and of television too, is so important: it can help to make culture more democratic. Culture must no longer be limited to a privileged minority, nor to

intellectuals, it must be within everybody's reach; it must penetrate into the countryside, into factories, people's halls, youth halls; wherever there is a citizen, it must go; it will no longer be a culture of books, but will find its true meaning in concrete reality transmitted by pictures and sounds.

Finally, radio and television in our countries represent a determining factor in bringing about a better knowledge of the world. They will become a powerful instrument of universal culture and will work towards binding closer ties between peoples. This is by no means the least of television's educational benefits. Consequently, it seems that radio and television can play a very great part in African countries in educating citizens and in improving their standard of living.

EDUCATIONAL RADIO AND TELEVISION IN THE ENGLISH-SPEAKING COUNTRIES OF AFRICA

(by Eric Adjorlolo)

Educational radio and television in Africa, whether north or south of the Sahara, has made considerable progress since 1964, the year of the Tokyo Conference.

African educators and broadcasting specialists realize that, for a continent with so many languages and such a great diversity of customs, and which is seeking knowledge and progress, radio and television could not have been better used than in the cause of educating the inhabitants of the continent.

I. Educational Broadcasting

In the areas, the educational broadcasts are either:

- under the direct responsibility of the various Ministries of Education; for example, Kenya, Nigeria, Sierra Leone, Uganda and Zambia;
- or the broadcasting organizations themselves : Ghana;
- or a trial venture between the Ministry of Education and the broadcasting organizations : Ethiopia.

II. Sound Broadcasts

Ghana

The Broadcasting Corporation broadcasts the following programmes: "Let' Speak English" - "Music For You" - "Say and Sing" - "Talking About Teaching" - "English Language and Current Affairs".

In 1966, a new programme "School Science" was introduced. Between 1964 and 1965, about 500 schools took the programmes in Ghana, but as of January this year, the number has increased to 2,400 schools which listen regularly to the schools broadcast programmes.

This is very encouraging and it is hoped that with the increase in listening facilities to schools, the Ghana Broadcasting Corporation will be able to serve all schools and educational institutions in the country.

In the teaching of French, Ghana has the "Bonjour Koyo" series. About 1,024 schools listen regularly to this series.

Kenya

The Voice of Kenya has been in action with its educational sound broadcasting for three years. Its programmes are intended for pupils in primary and secondary schools. This year, the Voice of Kenya transmits afternoon broadcasts to serving teachers. Special programmes have been planned such as languages, speech practice, organisation of activities in schools, the elements of child study and development and the principles involved in the teaching of reading.

The hope has been expressed in Kenya, that the listening teachers should realize that the radio can help them, but it is vital that they must work first with their radio and tutors, both before and after the broadcasts.

Uganda

Broadcasting is transmitted five days a week. There supplementary and enriching programmes for primary, junior and secondary schools. The teacher training colleges receive English programmes.

The principal needs and goals of Uganda are:

1. direct instruction for primary school pupils especially in English, science and mathematics,
2. direct instruction for primary school leavers since there are not enough secondary school places,
3. direct instruction for secondary school drop-outs,
4. adult literacy,
5. unity as general citizenship through the introduction of a common language other than English,
6. teachers' training at all levels

One of these school broadcast programmes won the Japan Prize.

Other countries which have not been reported here have various educational broadcasting programmes either used as direct instruction in certain areas for their citizens, or as information programmes.

Find out how your country uses the mass media for educational purposes. Listen to some of these programmes. Ask the programme producers to see what kind of feedback they get their audiences and how they produce these programmes.

There are, however, problems, in using radio and television especially for the education of the masses in Africa. These problems are summarised in the following quotation (Akrouit, *ibid.* p. 365): *ibid.* p. 365):

In the field of educational radio and television, promoters in African countries have to face many problems. These include financial problems owing to the high cost of equipment and production; insufficient staff; their training is subject to considerable difficulties. Training abroad, though undoubtedly useful and profitable, has the drawback that trainees coming back to their country are not always able to understand local conditions. It is increasingly important, therefore, that they should be trained on the spot. However, this is not always easy to arrange.

Moreover, the multiplicity of languages in some of our countries, insufficient means of communication, lack of electrification, and the high cost of receiving sets also stand in the way. However, in spite of all these difficulties thanks to the youth, enthusiasm and faith of our staff we have some chance of success, and it gives me great pleasure to be able to tell you that the work of a promotor, struggling against many odds, is truly exalting and that his efforts are often rewarded.

The Print Media

The print media have also been used for educational purposes in some African countries. The reason why this medium has been slow in helping the educational process to the extent that radio has developed, is that in most countries the press is privately owned. Therefore the priority is in reporting money-making items such as advertisements and newsworthy stories to attract wider reading. Where this private ownership is foreign, the newspaper models in the countries of origin is adopted, leaving almost no room for experimentation on newer patterns. In other cases, where the government owns the papers, the interest is in government political propa-ganda rather than any serious educational programme. However, a number of countries have successfully used the press medium to further specific educational objectives. As a curriculum developer you may want to study more on these possibilities such as Zambia's Orbit Magazine for the youth, and other places where columns in the daily or weekly newspapers are used to print educational materials.

Distance Education

The idea of using various aspects of the mass media to reach target audiences in different parts of the country has become

attractive to many African countries. This is because such a method of reaching people, if used for educational purposes, is much cheaper than building more schools and colleges for the same purpose.

The concept distance education is used to define a teaching programme where the student and the teacher are far apart, that is, they are distant from each other. The teaching process is then conducted by use of written materials which are sent to the learner by post, coupled with radio or television programmes which the learner can listen to or watch. A combination of various print and electronic media are used to achieve the instructional objectives.

In a number of countries in Africa and elsewhere, distance education has existed in various forms. The most popular form is the correspondence format where all the messages to and from the student are in written form. Nowadays, with the wide spread use of the electronic mass media - radio and television the approach which involves a combination of print, sound and visual media is possible in what is currently being called distance education.

Through such means, education is offered at various levels in society. The basic requirement is that the learner must be able to read and write competently in order to handle the correspondence course work load. Other requirements where the student is expected to use other media depend on the access to which the learner has to those media.

Some of the programmes which have been successfully conducted using distance education techniques are: Zambia - University degree education, Kenya - inservice for teachers, and supplemen-

tary school teaching, Nigeria, Malawi, Lesotho, Ethiopia, Ghana, and many others. Each country has defined areas in the educational needs of that country where this approach is utilized.

Distance education is included in this section on mass media because it serves as an example of how the mass media, print and other media can combine to offer various educational opportunities at a comparatively low cost.

How is it planned?

The actual structure and format varies from one situation to another situation. However, the following elements are part of the system:

- 1) Communication to and from the student is by means of the written word in written reading texts, study guides, programmed materials, written lectures and assignments.
- 2) Courses of study are divided into units with clearly stated objectives to guide the learner. Each unit contains self-assessment items which enable the learner to determine and evaluate progress in the learning, as well as obtaining feedback by mail from the tutor.
- 3) A few teachers can be used to teach thousands of learners at various places.
- 4) Other media such as radio, television, audio and video recording, films, slides, pictures, can also be used when possible or accessible to the learner.
- 5) Students sit final examinations and are able to acquire certification of the same quality as those in residential institutions.

- 6) Face-to-face sessions usually are included by arrangement so that the learner and the subject tutor may interact periodically.
- 7) The learner is able to progress at a pace convenient to his own circumstances. Provisions are given for those who wish to progress fast and those who may wish to move at a slower pace.

What distance education programmes does your country have?
Find out how they are organized and how effective they are.

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